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Acronyms

AEWSD	Arvin-Edison Water Storage District
Authority	Friant Water Users Authority
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CVP	Central Valley Project
Delta	Sacramento/San Joaquin Delta Estuary
DMC	Delta-Mendota Canal
DWR	California Department of Water Resources
EA/IS	Environmental Assessment/Initial Study
Exchange Contractors	San Joaquin River Exchange Contractors Water Authority
ITA	Indian Trust Assets
J&S	Jones and Stokes Associates, Inc.
LSJLD	Lower San Joaquin Levee District
MEI	Mussetter Engineering, Inc.
NEPA	National Environmental Policy Act
Reclamation/USBR	U.S. Department of the Interior, Bureau of Reclamation
RM	River Mile
SJRRHRP	San Joaquin River Riparian Habitat Restoration Program
SWRCB	State Water Resources Control Board
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1. PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

The San Joaquin River Riparian Habitat Restoration Program (SJRRHRP) proposes to conduct a pilot project on the San Joaquin River in 2000 to assist in the development of a plan for riparian habitat restoration of the upper portion of the San Joaquin River, from Friant Dam to the Merced River. To guide the development of the plan, including the hydrologic/hydraulic modeling effort, the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) would modify releases from Friant Dam during the period July 1 to October 1, 2000, for the purpose of assisting the SJRRHRP in obtaining data on the establishment and maintenance of riparian seedlings in the downstream channel and on ground water and surface water conditions in the project area.

Reclamation and the Friant Water Users Authority (Authority) are jointly preparing this Environmental Assessment/Initial Study (EA/IS) in compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). This EA/IS analyzes the environmental consequences of the proposed water releases on the San Joaquin River from Friant Dam/Lake Millerton. The precise quantity of water that could be released is uncertain at the time of preparation of this EA/IS. Therefore, a range of potential releases is evaluated.

1.1 STATEMENT OF PURPOSE AND NEED

As required under NEPA, this section contains a concise statement of the proposed action's purpose and need. Under CEQA, the underlying purpose of the project is also included in the statement of objectives included in the project description (Section 2.2).

The purpose of the proposed project in 2000 is to help establish sufficient data to guide the development of a long-term riparian habitat restoration plan for the San Joaquin River. More specifically, the project would provide information to determine what is preventing successful seedling establishment and long-term survival of riparian trees within the reach from Gravelly Ford to Mendota Pool (Reach 2). It would also serve to refine the hydrologic/hydraulic modeling for the river including the validation of existing models. The pilot project is needed in order to (1) to promote maintenance and/or recruitment of riparian tree species and (2) to calibrate and refine hydrologic/hydraulic modeling efforts and understand the ground and surface water conditions in the project area (a 62.5-mile segment of the San Joaquin River, specifically Reaches 1 and 2 of the river from Friant Dam to Mendota Dam). The data on vegetation maintenance and recruitment and the refinement of the hydrologic/hydraulic models would also assist in evaluation of potential effects on nearby landowners and water districts and in a better understanding of ground and surface water relationships.

1.2 BACKGROUND

The SJRRHRP is a collaborative effort of the Authority, the Natural Resources Defense Council, the Pacific Coast Federation of Fishermen's Associations, Reclamation, and the U.S. Fish and

Wildlife Service (USFWS), with the purpose of improving riverine and riparian conditions along the San Joaquin River. The goal of this program is to unify diverse interest groups on the San Joaquin River below Friant Dam to promote consensus-based riparian habitat restoration and the no-net loss of water supply to existing water users. Specific objectives of the program are to develop and implement a plan for restoration of a continuous riparian corridor along the reach, and to construct specific riparian habitat restoration projects.

In 1999, a pilot project was initiated to augment flows in the river for promoting dispersal and germination of seed from riparian tree species, and to test the hypothesis that managed flow releases from Friant Dam can be used to restore riparian vegetation that will survive over the long term. To guide decision-making and to quantify the impact of these augmented flows, data were collected on physical and biological variables by different groups including the California Department of Water Resources (DWR), the Authority, Jones & Stokes Associates, Inc. (J&S), Mussetter Engineering, Inc. (MEI), The Bay Institute, and the Natural Heritage Institute.

The first pilot project was conducted in 1999. Public concern with regard to the 1999 project was primarily centered on the potential increase in hydraulic roughness that could result from the long-term establishment of riparian vegetation in the river channel and the resulting potential for an increase in the water surface elevation that could increase overall flood risk downstream. (Hydraulic roughness is defined as a parameter used to reflect how the flow of water is impeded by channel shape and surface conditions.)

For 2000, another pilot project (2000 Pilot Project) is planned by the SJRRHRP to improve understanding of ground and surface water conditions, pending availability of funding, to manage flows from Friant Dam in order to provide data on maintenance/recruitment of riparian tree species and to calibrate and to refine hydrologic and hydraulic modeling efforts. The year 2000 project is the subject of this EA/IS. As such, the second pilot project represents a short-term, 1-year action with implications for the long term should the project be extended. The year 2000 Pilot Project is evaluated herein for its potential environmental effects in the short term and in the long term to the extent that these effects can be identified based on available information. The effective reestablishment of riparian habitat on Reach 2 of the San Joaquin River may require subsequent releases that may be proposed as part of the long term restoration plan for the river. The future restoration plan would be evaluated for environmental impacts (including flood channel capacity, levee stability, water supply, and land use) in an Environmental Impact Statement/Environmental Impact Report. This potentially larger action has yet to be defined, because the larger action would be based on the data developed from the results of the 1999 project, the current proposed 1-year project, and an investigation of restoration actions and water supply options.

1.3 AUTHORITY

The 2000 Pilot Project is part of the SJRRHRP and is being conducted under normal releases of the Central Valley Project (CVP). It is authorized by federal reclamation law and is consistent with state water rights.

2. ALTERNATIVES

INTRODUCTION

This chapter describes three alternatives: Establishment Flows (Alternative A), Maintenance Flows (Alternative B), and No-Action (Alternative C). The No-Action Alternative represents existing flow conditions based on existing hydrology in the San Joaquin River and operations at Friant Dam. The action alternatives would consist of either maintenance flow releases from Friant Dam or, in addition to these releases, supplemental water from Friant Dam for purposes of vegetation establishment. The preferred alternative is a maintenance flow of 10,800 acre-feet. The water is needed to support riparian habitat restoration studies for the San Joaquin River from Friant Dam to the Mendota Pool.

2.1 PROJECT LOCATION

The project area is a 62.5-mile segment of the mainstem of the San Joaquin River between Friant Dam at Millerton Reservoir (RM [RM] 267.5) and Mendota Dam (RM 205). Mendota Dam is located at the confluence of the San Joaquin River and Kings River North (Fresno Slough). The project area is located in Fresno and Madera counties. The portion of the project area that is the focus of riparian habitat restoration is the 24-mile segment from Gravelly Ford (RM 229) to Mendota Pool (RM 205). In particular, the proposed action's effects would most likely be focussed in the approximately 14-mile-long stretch between Gravelly Ford and San Mateo Avenue. This stretch is the seasonally dry portion of the river bottom. Figure 2-1 shows the location of the project area within the entire San Joaquin River area (Friant Dam to the Sacramento-San Joaquin Delta Estuary [Delta]) and California. Figure 2-2 shows the immediate project area, specifically the affected reaches (Reaches 1 and 2) of the river. Reach 2 contains Subreach 5 that is referred to in portions of the analysis (to be consistent with the studies prepared by MEI).

2.2 ACTION ALTERNATIVES

The objectives of the Pilot Project for 2000 are to aid in establishing sufficient data to guide the development of a potential long-term riparian habitat restoration plan for the San Joaquin River and to improve understanding of ground and surface water conditions. The project is needed to promote maintenance and/or recruitment of riparian tree species and to calibrate and refine hydrologic/hydraulic modeling efforts for restoration planning on the San Joaquin River between Friant Dam and Mendota Dam.

The 2000 Pilot Project would include the following elements in addition to the monitoring program elements described in Appendix A:

- Flow releases and/or modification of release patterns from Friant Dam to encourage the establishment of riparian tree seedlings (Alternative A) or maintenance of seedlings from 1997-1999 (Alternative B), to calibrate and refine hydrologic modeling efforts, and to improve understanding of ground and surface water conditions;

Insert Figure 2-1
Map of San Joaquin River Project Area and Vicinity

- Insert Figure 2-2

San Joaquin River Reaches

-
- Acquisition of additional water supplies to replace flows released to the river.

Key assumptions for Alternatives A and/or B are the following:

1. If at the time of implementing Alternative A the current release from Friant is only enough to satisfy riparian rights (approximately 200 cubic feet per second [cfs]), a 3-day "ramping up" period would be needed at 1,615 cfs or a total of 8,420 acre-feet. This is the water required to raise the water surface elevation up to the peak elevation described in the alternatives listed below.
2. All water discharges (performance objectives) that are listed below include the 200 cfs riparian release, and water requirement volumes are the incremental amounts and do not include riparian water release which is part of No-Action.
3. All discharge numbers reflect the flows that would be released at Friant and are not those that would be experienced in the Gravelly Ford reach.
4. All modeling of flows, peak elevations and drawdown rates was based on condition that would be experienced in Subreach 5, located within Reach 2 as described in the hydraulic and sediment modeling report created by MEI (2000a).
5. All alternatives assume a start date of July 1, 2000.
6. The adaptive management process would allow for data collected in the field during the releases and would be used to modify flows, if necessary, in order to ensure seedling survivorship as well as water conservation.
7. Supplemental water would come from potential releases from Friant Dam with no net loss to Friant water users, or any other water users except for the willing seller/willing buyer cooperative effort. Water availability would be based on hydrologic conditions, including previous flood releases and reservoir capacity, availability of water from willing sellers, and water conservation efforts that could reduce water demand in water year 2000 as explained in Sections 2.2.1 and 2.2.2 below. See also Section 2.2.3 for limitations on the sources of water.
8. Daily water releases from Friant Dam (contained in Appendix B) correspond to target surface water drawdown rates at Subreach 5 of 3 centimeters per day (for Alternative A only).

2.2.1 Establishment Flow (Alternative A)

This alternative provides peak flow from which a drawdown rate would decrease the flow and stage height and would eventually arrive at a base maintenance flow (Alternative B described in Section 2.2.2 below).

This alternative provides the minimum amount of the water necessary to create a viable recruitment flow but is not feasible for the year 2000 due to water supply constraints. A peak duration of two days would allow the germination and establishment of seedlings at the peak elevation. The 3 centimeter per day drawdown rate at Subreach 5 is slow enough that the roots of the seedlings should be able to follow the declining water table.

1. A 2-day peak release of 1,615 cfs (1,415 cfs above the approximate 200 cfs riparian release) from Friant Dam resulting in 1,300 cfs at Subreach 5.
2. Average drawdown of 3 cm/day at Subreach 5.
3. Maintenance flow of 60 cfs above riparian release and Friant's contract demands, which would result in a total flow of up to 260 cfs.
4. Estimated water requirement

Recruitment	38,000
Base flow	12,900
Ramp up	8,420
Total	59,320 acre-feet

2.2.2 Maintenance Flow (Alternative B)

This alternative is the preferred alternative because project constraints are such that a recruitment flow is not feasible. A maintenance flow would be released in order to serve two objectives. The first objective would be to provide water to the 1997, 1998 and 1999 seedlings identified in the J&S vegetation survey (preliminary and unpublished). The second objective would be to collect data that would increase the understanding of essential hydrologic and geomorphic processes as well as provide important biological information relative to seedling establishment and survival patterns. The refinement of these relationships would help to identify the potential for success of long-term restoration objectives. In a dry year, this may be the only achievable alternative.

1. Provide a base maintenance flow of 60 cfs above riparian release and Friant's contract demands, which would result in a total flow of up to 260 cfs from Millerton.
2. Estimated water required (July 1-October 1) is 10,800 acre-feet.

The proposed source of water for the Maintenance Flow (Alternative B) as of June 2000 is to bank May flood releases (water in excess of storage in Millerton Lake and bypassed from Friant Dam) in underground reservoirs and exchange this water for CVP contract water deliveries from the participating districts. Volunteering Friant Division districts with both a Class 1 and a Class 2 contract water supply utilized some of their currently unused groundwater recharge capacity to take delivery of Friant Division Class 2 contract supplies that otherwise were to be spilled as flood release from Friant Dam/Millerton Lake during the month of May 2000. The SJRRHRP Pilot Project will pay the participating districts' cost of delivery of this Class 2 water. In exchange, the districts will agree to sell the Pilot Project an amount of the districts' Class 1 supply this summer at the districts' cost (approximately $85 per acre-foot). This cost is estimated to be equivalent to the amount of water that could reasonably be expected to be recoverable for the districts' underground water banks (i.e., 1.5 acre-feet put into recharge, minus losses, provides 1 acre-foot of recoverable groundwater). The participating districts will be "kept whole" from a water supply standpoint, because they will have water underground equivalent to the amount of Class 1 water they will sell in the summer.

The participating districts and the Class 1 water supply that each will provide to the 2000 Pilot Project are:

- Chowchilla Water District 3,200 acre-feet
- Madera Irrigation District 2,333 acre-feet
- Arvin-Edison Water Storage District 5,000 acre-feet
- Southern San Joaquin Municipal Utility District 1,000 acre-feet

The maximum amount of water to be obtained under this program is 11,533 acre-feet. The water supply is less than originally estimated due to changes in hydrologic conditions and upstream reservoir operations. Flood releases (not related to the proposed action) are required in June, such that releases of Class 1 water for the proposed action would be delayed until July 1.

2.2.3 Mitigation Commitments

The two action alternatives described in the Draft EA/IS could have had impacts due to potential releases from Friant Dam and water purchases associated with either the establishment or the maintenance flows. These impacts could have resulted from changes in reservoir operations and additional water purchases/conveyance agreements. To avoid or mitigate these potential impacts to a level of no significant adverse effects, the SJRRHRP, Reclamation, and the Authority ensured that the following conditions were met in order to proceed with the 2000 Pilot Project. Potential impacts described in Sections 2.2.3.1 and 2.2.3.2 are avoided with the proposed water banking program under Alternative B.

2.2.3.1 Millerton Reservoir Operations

The proposed banking of May flood water bypassed from Friant Dam (described in Section 2.2.2) meets operational requirements described below. Concern no longer exists over the potential impacts to recreation, hydropower production, and the environment around Millerton Lake due to a program of May flood releases which would not take the reservoir to lower levels than would otherwise occur under normal operations. The following "thresholds of significance" were provided in the Draft EA/IS; and by staying within these differences, adverse impacts will be sufficiently avoided or mitigated:

1. The greatest difference in Millerton Lake storage between with and without 2000 Pilot Project releases (lesser amount in storage as a result of the Pilot Project) will not exceed 10,000 acre-feet at any time. This difference in storage approximates 2.5 feet maximum difference in reservoir water surface elevation.

2. There will not be any difference in Millerton Lake storage between with and without Pilot Project releases (lesser amount in storage as a result of the Pilot Project) between August 1, 2000 and September 30, 2000. This will provide assurance that a reservoir low-point problem (and thus curtailed water deliveries) will not be worsened by the implementation of the 2000 Pilot Project.

3. Lost power generation at Friant Dam will be fully compensated from a financial standpoint. Under Alternative B, there will be no impact this year.

2.2.3.2 Loss Water Purchases

The proposed banking of May flood water bypassed from Friant Dam will result in an exchange with CVP contract deliveries consistent with the requirements below. The proposed water banking program involves storage of flood releases in ground water recharge facilities for subsequent withdrawal and reuse during summer months. There is no net loss of ground water, therefore, no impact.

Depending upon the source of purchased water to cover channel and conveyance losses, the Draft EA/IS stated that environmental impacts could be potentially significant especially if the seller of the "loss water" were to replace their water sale with pumped ground water. The impacts of a potential water sale can be understood and mitigated to a less-than-significant level with some limitations on the conditions under which water is made available. The following impact avoidance and mitigation measures have been implemented for water purchases for the 2000 Pilot Project:

1. The water purchased will not result in additional water being exported from the Delta.

2. The water purchased will not result in the significant depletion/reduction of ground water resources in an overdrafted ground water basin with significant being defined as a depletion with measurable effects occurring beyond 1 year.

3. The water purchased will not result in the fallowing of additional farmland.

2.2.3.3 Monitoring and Coordination Plan

The Monitoring and Coordination Plan contained in Appendix A provides for data collection of physical and biological variables to understand the relationships between surface and ground water hydrology, channel hydraulics, and vegetation establishment and survival. This data collection and analysis effort by the SJRRHRP will be supplemented with field observations for the potential establishment of vegetation (type and location) that could affect flood flows and levee stability. Persons experienced with channel hydraulics and levee stability will conduct the field observations, and the results will be incorporated into ongoing studies and communicated to interested agencies and individuals. Problem areas will be identified. A specific program for vegetation control and/or removal (or other physical measures to resolve the problem) will be developed, in consultation with the Lower San Joaquin Levee District and other affected parties, during the 2000 Pilot Project monitoring and appropriate measures will be taken to mitigate any problems.

To address the concerns of the Lower San Joaquin Levee District (LSJLD) and the San Joaquin River Exchange Contractors Water Authority over possible growth of vegetation in the San Joaquin River channel, potential for increased flooding, and liability for flood control, an agreement between the affected parties (including Reclamation and the Authority) is expected to be completed prior to the release of water for the 2000 Pilot Project. Agreement is expected to include the following procedures and actions:

a. Resolution of liability issue concerning transfer of liability or increase of liability to or from any party relative to flood control on the San Joaquin River;
b. Mutual identification of the location, type, and extent of Pilot Project Vegetation with documentation on aerial photographs and vegetation transects;
c. A monitoring program to track the growth (or demise) of Pilot Project Vegetation with costs paid by the SJRRHRP;
d. Development of a methodology to analyze the effect of Pilot Project Vegetation on the flood carrying capacity of the affected reaches of the San Joaquin River;
e. Establishment of vegetation growth thresholds to identify problem Pilot Project Vegetation and remove it before it becomes a significant adverse factor in actual channel flood carrying capacity;
f. Advance permitting and approval for removal of Pilot Project Vegetation (or in lieu vegetation);
g. Establishment of funding for additional channel maintenance and related activities for removal of Pilot Project Vegetation or in lieu vegetation;
h. Determination by the California Reclamation Board that the LSJLD will not be deemed out of compliance with its flood control obligations, responsible for costs of Pilot Project Vegetation, or otherwise liable for impacts from the Pilot Projects.

In this manner, Reclamation and the Authority can ensure that there is no significant impact to legal users of water and no impact to the flow of floodwater in the river that would materially increase risk of flooding or otherwise impact the flood management system on the San Joaquin River.

2.3 NO-ACTION ALTERNATIVE (Alternative C)

Under No-Action, there would a base flow of approximately 200 cfs from Friant Dam over the July 1 to October 1 period, to provide the mandatory riparian release of 5 cfs below the farthest downstream diverter. The No-Action Alternative is Alternative C in the flow regimes discussed in Section 3.2.

2.4 REQUIRED APPROVALS AND PERMITS

This section describes the approvals and permits required to implement the 2000 Pilot Project. Consultation and coordination with other agencies is described in Chapter 4.

2.4.1 State Lands Commission

For the 1999 pilot project, a land use lease agreement from the State Lands Commission was required because of the installation of monitoring equipment on lands owned by the State of California. The 2000 Pilot Project includes increased activities and installation of additional equipment. The land use lease agreement with the State Lands Commission was authorized on April 20, 2000, and may need to be amended for the proposed project. A letter of non-objection from the State Lands Commission would be required.

2.4.2 State Reclamation Board

For the 1999 pilot project, a license and an encroachment permit were required from the Reclamation Board. The requirements for the 2000 Pilot Project may be identical, although the process may be simpler because there would not be any need to provide access for heavy equipment nor would any wells be drilled within the floodway.

2.4.3 State Water Resources Control Board

A permit under Water Code Section 1707 will not be required to prevent other parties along the river from pumping out water set aside for project purposes. Section 1707 deals with changes in place and purpose of use.

2.5 MONITORING AND COORDINATION PLAN

The proposed monitoring and coordination plan is provided in Appendix A. It applies under all alternatives including No-Action. In summary, it includes the following components:

- Evaluate timing of seed release for target riparian tree species;
- Install 15 permanent transects;
- Monitor physical and biological response variables annually;
- Model effects of established vegetation on future flood conveyance;
- Monitor coordination and data distribution; and
- Provide data analysis and reporting.

One of the primary purposes of the monitoring program is to identify if the experimental flow levels place the vegetation at a location that is (1) predicted by existing models to be desirable, and (2) outside of the low flow channel. Further, the location of the vegetation may serve to stabilize the channel, so that future flows actually result in downcutting and an increase in the channel capacity as is anticipated to occur (Harvey 2000, pers. comm.). The monitoring will also help to identify the efficacy of the timing of the flow sizes and releases relative to the timing of the different tree species being targeted.

Under Alternative B, the monitoring program will identify the "success" of the flows relative to the maintenance of vegetation. It will provide the data to show if the flows occur in the appropriate location. If the resulting vegetation is established too low, it will likely either be eliminated through downcutting, the high mobility of the channel, or channel erosion. In addition, if vegetation is established too high, it will likely become desiccated and die prior to establishment.

To improve understanding of ground and surface water relationship, depth to ground water will be monitored during different seasons. Elevation of the water table will be measured at five

elevations. Quantification of the presence and depth of sand and clay layers may be measured nonintrusively.

Specific objectives for the 2000 Pilot Project are:

Objective 1. Establish 15 monitoring transects/cross sections in Reach 2 (12) and Reach 1 (3), including the suitable transects and sites with logged wells that were used in 1999.

Objective 2. Design monitoring methodologies and monitor a core set of physical and biological variables at each transect/cross section.

Objective 3. Release sufficient water to maintain seedlings that germinated in 1997, 1998, and 1999, and are present after the high flows have receded in 2000.

Objective 4. Determine timing of seed maturation and release of riparian tree species during spring and summer months.

Objective 5. Collect and communicate the monitoring results among the interested parties in a coordinated and timely manner.

Objective 6. Analyze the effects of vegetation established in response to the 1999 and 2000 Pilot Project releases on future flood carrying capacity and levee stability.

Meeting these objectives would help to provide information on successful seedling establishment and on ground and surface water conditions to refine hydrologic and hydraulic modeling for long-term planning.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter discusses the environmental consequences of the alternatives on the affected environment. The affected environment (existing conditions) for these resources is described briefly with references to supporting documentation.

The entire project area is a 62.5-mile segment of the mainstem of the San Joaquin River between Friant Dam and Mendota Dam (as described in Section 2.1). The proposed releases from Friant Dam would primarily affect the subreach between Gravelly Ford and Mendota Dam. Depending on how the water would be made available for release, other areas and water users could be affected in the project vicinity. Willing providers of water have been identified, and the analysis focuses on the releases of water and potential effects on the river corridor based on the operational parameters listed in Section 2.2.3 to avoid or mitigate potential impacts associated with reservoir operations and loss water purchases, and on the preferred alternative to provide a maintenance flow of 10,800 acre-feet from a water banking program.

Water supply and flow regimes are the focus of the environmental impact analysis in Chapter 3, because the other study elements associated with the 2000 Pilot Project would not result in any significant change in the environment. The installation of measuring devices and markers and other elements of the monitoring program (Appendix A) do not have the potential to affect the physical or human environment.

Because this document is an Initial Study (CEQA) as well as an Environmental Assessment (NEPA), the CEQA environmental checklist has been incorporated into the text of this chapter.

Environmental Factors Potentially Affected

The environmental factors checked below from the CEQA checklist could be potentially affected by the proposed project as indicated in the following sections. The key areas of potential effects are hydrology and water quality, biological resources, and energy. These are discussed first, followed by the remaining sections of the environmental checklist.

❑	Aesthetics	❑	Agriculture Resources	❑	Air Quality
■	Biological Resources	❑	Cultural Resources	❑	Geology/Soils
❑	Hazards and Hazardous Materials	■	Hydrology/Water Quality	❑	Land Use and Planning
■	Mandatory Findings of Significance	❑	Mineral Resources	❑	Noise
❑	Population and Housing	❑	Public Services	❑	Recreation
❑	Transportation/Traffic	❑	Utilities and Service Systems		

3.1 BACKGROUND

This chapter is based on the following documents and studies that have been prepared by the SJRRHRP:

- *Analysis of Physical Processes and Riparian Habitat Potential of the San Joaquin River, Friant Dam to the Merced River*, October 1998 (J&S 1998)

- *Hydraulic and Sediment Continuity Modeling of the San Joaquin River from Friant Dam to Mendota Dam, California*, Mussetter Engineering, Inc., March 2000 (MEI 2000a)

- *Evaluation of Roughness Effects of Increased Vegetation Associated with 1999 Pilot Project Flow Releases*, May 2000 (MEI 2000c)

The affected environment is presented first, followed by environmental consequences and mitigation for the three resources that could be affected: hydrology and water quality, biological resources, and energy production. These sections are followed by the remaining sections of the CEQA checklist that explain impacts for the other specific resources. Mandatory findings of significance conclude the chapter.

3.2 HYDROLOGY AND WATER QUALITY

3.2.1 Affected Environment

This section is organized to address the following hydrologic and hydraulic concerns: water supply and operations, flood carrying capacity, and levee integrity.

3.2.1.1 Water Supply and Operations

Existing Water Supply

The Friant Unit has 28 water districts and contains over 860,000 acres of farm land in portions of Fresno, Kern, Merced, and Tulare counties. It encompass the most important agricultural production areas in the Central Valley and the state. The Friant Unit was designed and built to provide surface water to supplement the ground water use in the area, thereby helping to alleviate the overdraft.

Surface water supplies are stored and released from Millerton Lake on the San Joaquin River. Millerton Lake, with a total storage capacity of 520,500 acre-feet, is formed by Friant Dam on the San Joaquin River. The watershed upstream of Friant Dam is about 1,630 square miles in size. Significant reservoir storage exists upstream of Friant Dam and influences the timing of the inflow to Millerton Lake. These reservoirs are operated by Southern California Edison and Pacific Gas & Electric for power production.

Reclamation operates Friant Dam for flood control and water supply. The U.S. Army Corps of Engineers (USACE) has jurisdiction over the flood control operations and reserves up to 390,000 acre-feet per year for flood control storage (USACE 1975).

The allocation of water from Millerton Lake to Friant Division contractors utilizes a two-class system. Class 1 is considered a firm supply and amounts to the first 800,000 acre-feet of yield from the San Joaquin River and Millerton Lake. Class 2 water is present only after Class 1 allocations have been fully met. Class 1 water contracts are generally with contractors whose service area have limited or no access to good quality ground water. Class 2 water is typically under contract to those districts that have access to good ground water supplies and can accept recurring deficiencies by utilizing the available ground water as their primary source of water during these times. These areas generally have excellent recharge capabilities which are utilized in wet years to store excess available water underground for use in times of reduced surface water deliveries. Reclamation has contracts with the Friant Division districts for 800,000 acre-feet of Class 1 water and 1,401,475 acre-feet of Class 2 water. For example, in 1996 over 1.5 million acre-feet of surface water was delivered from the CVP, accounting for 50 percent of Friant's total water supply that year.

The annual water supply from the Friant Division is determined independently from other divisions of the CVP. On February 15 of each year, Reclamation provides contractors with an estimate of the water supply for the coming contract year based on hydrologic conditions, water supply storage in upstream reservoirs, and assumptions based on statistical analysis of historic records. Based upon the flood control diagram prepared by the USACE, part or all of the dedicated flood control storage may be used for conservation storage, depending on the time of year and the current flood hazard. The water delivery forecast is adjusted throughout the year based on current storage in Millerton Lake and forecasted inflow to Millerton Lake. During the irrigation season, the water deliveries can be reduced if conditions in Millerton Lake indicate that less water is available than originally forecasted.

Flood control operations of Millerton Lake are influenced by the storage available in upstream reservoirs. Flood control releases from Millerton Lake may be used to satisfy portions of deliveries to the Mendota Pool Contractors and the San Joaquin River Exchange Contractors Water Authority (Exchange Contractors) on the San Joaquin River at Mendota Pool. In such cases, Millerton Lake operations are coordinated with operations of the Delta-Mendota Canal (DMC) in the Delta Division to use all available Millerton Lake flood control releases before additional water is delivered to Mendota Pool. During wet hydrologic periods, overflow from the Kings River may enter the San Joaquin River Basin at the Mendota Pool through the Fresno Slough. This water is also used to meet demands at Mendota Pool. Flood control releases from Millerton Lake that exceed 1,500 cfs in the San Joaquin channel at the bifurcation structure are diverted into the Chowchilla Bypass which helps to avoid flooding of agricultural lands and cities (Firebough and Mendota) located in the floodplain along the San Joaquin River below Gravelly Ford.

Water is also delivered to eight Cross Valley Canal districts from Millerton Lake under a complex exchange agreement that allows for the exchange of equivalent amounts of water

between Arvin-Edison Water Storage District (AEWSD) (a Friant Division contractor) and eight districts that contract for water with the United States out of Shasta Dam and Reservoir.

Water is delivered to Friant Unit contractors from Millerton Lake through the 152-mile-long Friant-Kern Canal flowing south and 36-mile-long Madera Canal flowing north. The flow rate of the Friant-Kern Canal and the Madera Canal is 5,300 and 1,000 cubic feet per second (cfs), respectively. The Cross Valley Canal, constructed by local agencies, conveys water across the valley from the California Aqueduct to Bakersfield. The canal passes under the terminus of the Friant-Kern Canal. Water can be exchanged between these two canals on a limited basis.

Each year Millerton Lake is operated to deliver all the conservation storage to the contractors. That is, the lake is drawn down to the minimum of conservation storage. The lake is refilled in the winter and spring from rain and snowmelt.

1999 Pilot Project

An important aspect of the proposed project is the method of securing the appropriate water supplies to meet the Pilot Project flows. The 1999 pilot project achieved the needed flows by releasing water from Millerton Lake and allowing the water to flow to the Mendota Pool. At the Mendota Pool, the water was diverted by Mendota Pool Contractors for irrigation use on the west side of the valley. For the 1999 pilot project, the Mendota Pool Contractors used Millerton Lake water instead of Delta water for a small portion of their irrigation water. The water diverted at the Delta for the Mendota Pool Contractors was conveyed in the California Aqueduct to the Cross Valley Canal. At the Cross Valley Canal, the water was delivered to the AEWSD in lieu of water that AEWSD would receive from Millerton Lake through the Friant-Kern Canal.

This complicated method of trading San Joaquin River water for Delta water involved agreements with several water districts and federal and state agencies. Because there are flow losses associated with water flowing from Millerton Lake to the Mendota Pool, the 1999 pilot project had to find a source of water to replace the losses.

Because of capacity constraints in the Cross Valley Canal during the 1999 pilot project, the water from the Delta could not be delivered to AEWSD at the same time as the water was released from Millerton Lake to the Mendota Pool. The surplus capacity in the Cross Valley Canal that was needed to wheel the pilot project water was not available until October. This resulted in a time delay between the time when the pilot project water began flowing down the San Joaquin River and when the water users were repaid. During this period, storage in Millerton Lake was used to meet pilot project flows; and the lake was drawn down to levels lower than forecasted.

The water to cover the river losses associated with the pilot project release was obtained from the Kern-Delta Water Conservation District, south of Bakersfield. The water was supplied to the Friant Unit through a connection with the AEWSD.

3.2.1.2 Flood Carrying Capacity

The design flood carrying capacity of San Joaquin River is reported by the DWR ("Flood Channel Design Flows," 1985). Between the Gravelly Ford guaging station on San Joaquin River and the bifurcation between San Joaquin River and Chowchilla Canal Bypass the design capacity is 8,000 cfs. Between the Chowchilla Bypass and DMC, the design capacity of San Joaquin River is 2,500 cfs. Downstream from Mendota Dam the design capacity of the river is 4,500 cfs. These design capacities include a nominal freeboard allowance of 3 feet. The actual flow carrying capacity of the river is reported to be less (Chedester 2000, pers. comm.).

3.2.1.3 Geologic Setting and Geotechnical Conditions

The San Joaquin River flows westward from the Sierra Nevada into the San Joaquin Basin then turns northwestward and flows to the Delta. The San Joaquin Valley occupies the southern half of the Great Valley that runs from Redding in the north to south of Bakersfield. The Stockton Arch, an east-west-trending subsurface anticline acts as a drainage divide that separates the San Joaquin Basin from the Sacramento Basin to the north. The San Joaquin Basin is bounded on the west by the northwest-trending Coast Ranges and on the east by the Sierra Nevada.

Cretaceous granitic rocks underlie the Sierra Nevada. Jurassic and older metamorphic rocks of the Western Metamorphic Belt surround the granitic intrusions. Younger Tertiary volcanic rocks overly the granitic and metamorphic rocks. The Sierra Nevada is tilted to the west and dips under the San Joaquin Valley. The granitic and metamorphic rocks comprise the basement rocks of the valley.

Cretaceous, Tertiary, and younger strata that have been uplifted, folded and faulted underlie the Coast Ranges. On the east side of the Coast Ranges, these strata dip eastward under the valley. The San Joaquin Basin is an asymmetrical synclinal trough with a north-northwest-trending axis. Cretaceous, Tertiary, and younger strata underlie the San Joaquin Basin. Hydrocompaction and withdrawal of ground water has caused subsidence of the valley. This subsidence is on the order of 30 feet between Mendota and Los Banos downstream of Mendota Dam (Ouchi 1983).

Pleistocene terraces, which are remnants of older alluvial fan surfaces, tilt to the west in Reach 2 (RM 205 to RM 229). The San Joaquin River is a slow-moving meandering stream within the study area. The Pleistocene terrace surfaces are slightly elevated above its modern (Holocene) flood plain. In the event of flooding, these terraces may provide limits on the width of the flood channel.

3.2.1.4 Levee Conditions and Performance During High Flood Stage

The levees along this reach of the San Joaquin River were built of local sands and silty sands which were part of the alluvial fan deposits along the river banks. The typical levee cross section had 2H:1V (horizontal to vertical) slopes on the land side and 3H:1V on the water side. The typical levee crest ranges from 12 to 20 feet. Most of the levees along this reach of the San

Joaquin River vary from 2 to 6 feet in height with some stretches of levees as low as 6 inches. The levees are maintained by the LSJLD, and are rated in fair to good maintenance conditions based on 1995 Inspection Report issued by the DWR (contained in USACE 1997a, 1997b).

Because of the high permeability of the sandy material forming the levees and foundation, through-levee and under seepage have been observed in multiple instances during past flood events. Further the lack of cohesion of the levee and foundation materials render them highly susceptible to erosion and scour during high velocity flows. During the recent flood event of the winter 1996-97 the San Joaquin River levees and banks suffered extensive damage and levee breaks resulting in the flooding of thousands of acres of agricultural land.

Higher than average rainfall fell in the San Joaquin River Basin during the months of November and December 1996. Much of this rainfall fell as snow in the Sierra Nevada. At the end of December a series of storms known as the "Pineapple Express," a supersaturated warm storm system, entered California. During the last week in December an equivalent of one month's rainfall fell, which combined with the melting snow caused extensive runoff (USACE 1997b).

Millerton Reservoir behind Friant Dam on the San Joaquin River is the major flood control structure upstream of the damage levees. The average daily inflow in the reservoir for January 2nd and 3rd was over 10 times the typical inflow for this time of year. Inflow into the reservoir for these two days exceeded 30,000 cfs. The reservoir attenuated the average daily outflows to about 25,000 cfs. These high inflows increased reservoir storage to just under the maximum ever recorded in June 1973. The peak outflow was 56,900 cfs.

The average daily release of approximately 25,000 cfs on January 3rd and 4th exceeded the previous maximum average daily release of 14,900 in February 1986. A preliminary estimate of the return period for these release flows is well over 100 years.

Damages to levee and river banks associated with the 1996-97 flood event included seepage through the levee and supporting foundation causing the occurrence of sand boils on the land side of the levees. The amount of sands carried out through the sand boils was indicative of an internal erosion and piping process. The high velocity of the flows releases also caused erosion and scour of the levee and banks, causing sloughing and deterioration of the inboard sides of the levees. Scour holes up to 20 feet deep were reported near the levee toe, which progressively undermined the levees in some places. Because of the emergency release from Friant Dam, the flood carrying capacity was exceeded causing levee overtopping and breaks resulting in unprecedented flooding of the low-level backlands.

3.2.1.5 Historical Flows

Analyses of historic flows in San Joaquin River were prepared by MEI and reported in "Hydraulic and Sediment Continuity Modeling of the San Joaquin River from Friant Dam to Mendota Dam, California" (MEI 2000a).

The MEI analyses indicate that for the period 1949 through 1998 the mean daily discharge below Friant Dam averaged about 200 cfs between early August and late December. Between late December and early May, average mean daily discharges increased to about 1,700 cfs then decreased to about 200 cfs by early August. It should be remembered that these flows are average mean daily discharges for the 1949-98 period of record; flows during flood events greatly exceed these average flows.

MEI also completed flood frequency analyses of San Joaquin River as part of their studies. These analyses are summarized in the following tabulation and indicate that the design capacity of the river at Gravelly Ford is equaled or exceeded about once every 10 years.

Table 3.2-1 Flood Frequency for San Joaquin River

Flood Recurrence Interval	2 Years	5 Years	10 Years	30 Years	50 Years	100 Years
Peak Flow Below Friant Dam	1,000	5,000	8,000	8,000	33,000	70,000
Peak Flow at Gravelly Ford	900	4,700	9,000	9,000	32,700	64,000

Peak flows that will occur downstream from the Gravelly Ford gauging station during flood events depend upon whether or not the flood control levees fail. For example, during the floods of December 1996 through February 1997, the average daily flow below Friant Dam peaked at 25,556 cfs on January 4. This flow combined with downstream runoff and resulted in a peak average daily discharge at Gravelly Ford of 37,843 cfs on January 4. However, the peak average daily flows in Chowchilla Bypass and San Joaquin River below the bypass were only 7,302 cfs and 2,394 cfs, respectively. The excess flow from Gravelly Ford overtopped and failed the flood control levees and ponded behind the levees in the river reach. (USACE 1997a,b)

3.2.2 Environmental Consequences and Mitigation

This section begins with the CEQA checklist and summary statements to explain the checklist determinations. Following the checklist are individual sections for evaluation of impacts to water and supply operations, flood carrying capacity, and levee integrity.

	Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Violate any water quality standards or waste discharge requirements?	❑	■	❑	❑
b)	Substantially deplete ground water supplies or interfere substantially with ground water recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	❑	❑	■	❑
c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	❑	■	❑	❑
d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	❑	■	❑	❑
e)	Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	❑	❑	❑	■
f)	Otherwise substantially degrade water quality?	❑	❑	❑	■
g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	❑	❑	❑	■
h)	Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	❑	■	❑	❑

	Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	❑	❑	■	❑
j)	Inundation by seiche, tsunami, or mudflow?	❑	❑	❑	■

Discussion: Following the summarized responses to the checklist is a more comprehensive discussion of environmental consequences of the different alternatives.

a) Water quality objectives for the San Joaquin River are set by the State Water Resources Control Board (SWRCB) in the Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and the San Joaquin River Basin, Fourth Edition. The objectives were established to protect water quality and the beneficial uses of the river and Delta. Specific water quality objectives for the reach from Friant Dam to Gravelly Ford are that electrical conductivity shall not exceed 150 micromhos/cm. The proposed project would add water to this reach from Millerton Lake, improving the water quality during program operations. Replacement water would be used for irrigation of lands currently in production. The use of this water therefore should not result in agricultural runoff patterns that are different from existing conditions.

Depending on the method to supply the water for this project and the means to replace the water in the Friant Unit, this project could affect the timing of flows down the San Joaquin River, Friant-Kern Canal, or the Madera Canal. For example, if a large amount of project water were derived from Millerton Lake storage, refilling the storage could affect the spills from the reservoir to the river or deliveries to the canals in subsequent years. This could potentially affect the water quality of these watercourses. However, the repayment of water for this project would be timed to avoid water quality problems. This is a less-than-significant impact with mitigation to control the timing of the repayment water incorporated into the project. See Section 2.2.3. Also, the water banking program under Alternative B (10,800 acre-feet) would not affect significantly the timing of flows.

b) The project alternatives, as defined and with the limitations described in Section 2.2.3, would not use existing ground water to supply the San Joaquin River flows or offset changes in surface water deliveries for the project. However, the preferred alternative of a maintenance flow provided by a flood bypass/ground water banking proposal would (1) affect the timing of ground water recharge to the San Joaquin River below Friant Dam, and (2) provide short-term ground water recharge to basins underlying the participating districts in the southern San Joaquin Valley. The delay of ground water recharge from flows in the San Joaquin River from May (flood releases not made) to July (when project

releases would be made) is not significant. In the districts where ground water would be recharged, the effect is also less than significant. The ground water would be banked for approximately 1 to 2 months and withdrawn by the participating districts in exchange for Class 1 surface supplies. Data from the project would assist in understanding the ground and surface water relationships in the project area.

c) This project would not affect the local drainage patterns. However, the project would change the regional hydrology of the San Joaquin River between Friant Dam and Mendota Pool by increasing the flow from June through September. There are many potential sources of this water, and replacing the water could potentially alter the hydrology of another watercourse or reservoir. The proposed flood bypass/water banking/exchange program for making water available in 2000 under Alternative B would not alter significantly the hydrology of other water courses or reservoirs. Limitations on the source of project water explained in Section 2.2.3 would avoid potentially significant impacts under all alternatives. No existing ground water is to be used directly.

d) The changes in regional hydrology because of the project are described in (c) above. The project would not affect regional flooding by releasing additional water for the riparian restoration. Millerton Lake storage decreases will not exceed 10,000 acre-feet at anytime; therefore, flood releases the following winter would not be affected. See Section 2.2.3.

e) The project would not affect stormwater drainage systems except the San Joaquin River as described in (d) above. There is no impact on stormwater drainage systems.

f) The project alternatives would not otherwise substantially degrade water quality. See the comment under (a) above.

g) The pilot project alternatives would not place housing within a delineated floodplain. There is no impact.

h) The project would not directly place structures in the floodplain. Under Alternative A (which is not the preferred alternative) new riparian vegetation would be encouraged in the floodplain and could potentially obstruct or impede floodwater. Alternative B would provide vegetation maintenance flows but is not intended to establish new vegetation. It is unknown at this time what percentage of woody riparian vegetation initiated by the 2000 Project (or continued from the 1999 project) would survive over the long term without subsequent water releases after 2000. Woody vegetation, that could affect flood flows and/or levee stability, established or nurtured by the 2000 Pilot Project within the reach or subreaches of river affected by the 2000 Pilot Project, will be identified during 2000 Pilot Project monitoring, and a program for its management would be developed and implemented.

i) See response (h) above. Levee failure is discussed in Section 3.2.2.3, and there is no adverse effect on levee integrity.

j) There is no risk of inundation by tsunami because of this project, so there is no impact.

3.2.2.1 Water Supply and Operations

The source of water for the 2000 Pilot Project includes the following potential actions to obtain the water:

- Develop an exchange, and/or
- Purchase water from willing sellers.

The principles of the riparian habitat restoration program include avoiding actions that harm another water user in the Friant Unit or in the surrounding area (Moss 2000, pers. comm.). Limitations to reservoir operations and loss water purchases are part of the description of project alternatives (Section 2.2.3). These limitations would ensure that impacts would be avoided or mitigated to a less-than-significant level.

Exchange Water

The exchange agreement used in 1999 involved many parties to implement the complex exchange of Delta water with San Joaquin River water. For this program to work again, a similar arrangement would have to be made to identify periods when there is available capacity in the Cross Valley Canal or to utilize other options for reservoir repayment.

The exchange would follow these steps (but is unlikely to occur in 2000):

- A volume of water would be released to the San Joaquin River for the program. Because Millerton Lake is operated to fully utilize the water stored in the conservation space, the Pilot Project water is water that would otherwise be diverted to the Friant-Kern Canal or Madera Canal.
- The Mendota Pool Contractors would divert the water at the Mendota Pool in lieu of water normally taken from the DMC. The water in the DMC may have come from a direct diversion at the Delta or released from the federal share of San Luis Reservoir.
- The DMC water not taken by the Mendota Pool Contractors would be conveyed to the California Aqueduct and rediverted into the Cross Valley Canal.
- The water would be taken from the Cross Valley Canal by Friant Unit contractors (or other willing seller) in lieu of an equal amount of water it would normally receive from the Friant-Kern Canal. This amount of water would remain in Millerton Lake and "make up" the water released to the river for the program.

The proposed exchange for 2000 involves capturing flood water (water in excess of storage in Millerton Lake) during May and delivering it to underutilized ground water recharge facilities and exchanging it for portions of planned contract deliveries in July.

Purchase Water from Willing Sellers

A potential source of water for the 2000 Pilot Project is purchased water from willing sellers (districts or farmers willing to sell and transfer the water). The water would be available from surface water supplies, water conservation, water banking, and other irrigation efficiencies. It would not be derived from or replaced by ground water pumping in overdrafted areas (above planned recharge associated with the flood release/class/exchange described above) or by the fallowing of new land in 2000 in order to avoid potential impacts to ground water supplies and to agricultural production (Section 2.2.3).

Identifying willing sellers of water is complex and requires time, but this type of water transfer occurs on a regular basis throughout the CVP. The water needed to replace the river losses during the 1999 pilot project was derived from a transfer.

Transfers of water that a district has under contract but was not going to use this year could result in an increase in diversions at the Delta or other locations. However, specific impact avoidance measures incorporated into the proposed action prohibit water purchases that would result in additional water being exported from the Delta (Section 2.2.3). The proposed water banking would involve willing sellers within the Friant Division who would sell Class 1 water in the summer in exchange for water delivered early and stored underground.

Alternative A - Establisment Flow

There is one supplemental water alternative to provide flow to the San Joaquin River. It provides a base flow and a short-duration spike in the flow to encourage establishment of riparian seedlings at an elevation outside the low flow channel. The supplemental flow would also ramp up (gradually increase) to the peak flow and then gradually decrease. This supplemental water alternative would add flow to the existing base flow of 200 cfs assumed for the No-Action Alternative.

Alternative A requires 59,320 acre-feet of water delivered on a pattern that includes the base flow, ramping flow, and flow spike. The peak flow would be 1,615 cfs (1,415 cfs above the No-Action Alternative flow). After the peak flow has occurred, the supplemental flow would ramp down to 260 cfs (60 cfs above the No-Action Alternative flow). This water would be released from July 1 through September 30.

(1) Exchange Water

The 1999 pilot project was operated for a supplemental release of 33,000 acre-feet. This alternative for the 2000 Pilot Project would almost double that amount of water. The pattern of the release matches the period of peak water needs at Mendota Pool and,

therefore, the water could be used in lieu of the usual diversions through the DMC to the Mendota Pool Contractors. However, this is also the peak irrigation period along the Cross Valley Canal, and surplus capacity may not be available to convey the replacement water to the Friant Unit. If capacity is not available, then another arrangement for repayment would be developed or the alternative would not be implemented. Repayment must be consistent with the requirements in Section 2.2.3.1.

Alternative A has the potential to influence agricultural operations and ground water conditions. The potential effects would be mitigated by structuring the project to minimize the time delay between release of project water down the San Joaquin River and repayment. In addition, repayment would be structured to be completed by October 1 and avoid carrying over any storage changes until next year.

(2) Purchase Water from Willing Sellers

This option involves finding willing sellers of surface water this year and purchasing the water for the 2000 Pilot Project. The quantity of water in this alternative is substantial and may be difficult to purchase given the competition for water in the San Joaquin Valley. (This year, CVP contractors on the west side of the valley will receive about 60 percent of their supply, forcing these districts to look for other supplies). Water districts along other rivers in the San Joaquin River Basin, could be sources of water transfers, but physical connections would be needed to get the water to Millerton Lake. It is expected that the water purchase would occur in conjunction with an exchange program to minimize the quantity required to the amount needed to cover conveyance losses of 17,800 acre-feet (estimated at 30 percent of the volume of water released at Friant Dam). There would be no fallowing of land above existing conditions, to generate this volume of water, so there would be no economic impacts to the agricultural community.

Alternative B - Maintenance Flow

This preferred alternative provides a base maintenance flow of up to 260 cfs from Millerton Lake to Mendota Pool. This would require about 10,800 acre-feet, an amount about one-third of the 1999 pilot project flow.

(1) Exchange Water

The exchange of Delta water for San Joaquin River water for the Maintenance Flow Alternative would require similar agreements and be subject to the same capacity limitations as described for Alternative A. There would be no time delay for refill on Millerton Lake if the flood bypass/water banking proposal is implemented, and no exchange of Delta water.

(2) Purchase Water from Willing Sellers

This option will be accomplished without localized effects to water users or to ground water basins affected by overdraft. Conveyance losses are estimated to be up to 9,720 acre-feet (up to 90 percent of water released at Friant Dam). For the proposed sale of Class 1 water made available by May flood releases from Friant Dam that bypassed the river and that would be stored in ground water recharge facilities of the participating districts, there would be 1.5 acre-feet put into recharge that would provide 1 acre-foot of recoverable ground water. Subsequent project releases in the summer would result in ground water recharge of aquifers connected to the San Joaquin River with no significant impacts due to the timing of the releases (from May to Summer).

Alternative C - No-Action

The No-Action Alternative would maintain the base flow in the San Joaquin River but not supplement this flow with additional water. The base flow for the No-Action Alternative is assumed to be approximately 200 cfs. This flow was derived from recent analysis of geomorphologic and vegetation conditions on the river. The current regulatory standard is 5 cfs at Gravelly Ford (Moss 2000, pers. comm.). The No-Action Alternative also includes monitoring and assessment of the riverine conditions to ascertain the effects of the 1999 pilot project. There would be No-Action taken to secure additional sources of water as identified above.

3.2.2.2 Flood Carrying Capacity

The impacts of increased channel vegetation on flood carrying capacity of San Joaquin River were analyzed by MEI and J&S and are reported in their March 2000 report, "Evaluation of Roughness Effects of Increased Vegetation Associated With 1999 Pilot Project Flow Releases" (MEI 2000b). It concluded that the increased vegetation associated with the 1999 pilot project had little impact on the hydraulic capacity of the channel.

Roughness values and the assumed vegetation areas and plant survival rates that were adopted in the studies were considered conservatively high by the investigators. The study is currently under revision by MEI and the SJRRHRP. Results of the May 2000 report (MEI 2000c) indicate the following:

- The effects of the additional vegetation tend to increase with increasing discharge because, as the flow depth increases, more of the water comes into contact with more of the vegetation, although the effect is relatively small. The model results indicate that the short-term effects of the vegetation (2 years of growth) on the water-surface elevations are very small, with an average increase throughout the reach of about 0.02 foot (about 0.25 inch) above baseline conditions at a Friant Dam release of 8,000 cfs, and a maximum increase at that discharge of about 0.1 foot occurring near RM 227.5. After 10 years of growth, the effects are somewhat larger, but still relatively small. The average increase in water-surface elevation throughout the reach for a Friant Dam release of 8,000 cfs is about 0.08, with the largest increases about

0.2 to 0.25 foot occurring between RM 226 and RM 228.5 in Subreach 4. The maximum increases are smaller in Subreaches 5 and 6, and are about 0.2 foot near RM 217.5 and RM 219, and 0.19 foot near RM 215, respectively.

- Model runs for lower discharge associated with Friant Dam releases of 1,000 and 4,000 cfs show that the effects of the vegetation increase with increasing discharge. This occurs because more of the new vegetation becomes inundated with increasing discharge. The effects that were described in the previous paragraph are, thus, significantly reduced at the lower discharges.

The National Flood Insurance Program administered by the Federal Emergency Management Agency defines a designated floodway as "the channel of a river and adjacent flood plain that must be reserved in unobstructed condition in order to discharge the base flood without increasing flood levels by more than one foot." Some communities apply more restrictive criteria that reduces the maximum allowable rise to no more than 0.5 foot. The purpose of this designation is to avoid the possibility of significantly increasing upstream flood elevations and the associated damages. The maximum predicted increase in water-surface elevation associated with the new vegetation after 20 years of growth using the worst-case *n*-values at a Friant Dam release of 8,000 cfs is less than even the more restrictive criteria, and is only about 60 percent of the more restrictive criteria using the best-estimate values. (MEI 2000c)

Based on studies completed in May 2000 and conflicting criteria for determining significance, it is concluded in this EA/IS that a 1-year water release project would not have a potentially significant impact on the flood carrying capacity of the river in the short term. However, there may be cumulative effects of the proposed action over the long term when combined with the continuance of growth from the 1999 project, the nurturing of the 1999 vegetation, the growth of pre-1999 vegetation, and other spreading of vegetation in the project area. These potentially significant effects will be mitigated to a less than significant level through the additional monitoring and control efforts described in Section 2.2.3.3.

3.2.2.3 Levee Integrity

No adverse impacts over existing conditions are expected from the No-Action (Alternative C) or the Maintenance Flows (Alternative B) alternatives. The flows associated with these alternatives (150 to 200 cfs) will be confined within the low flow channel, and hence would not raise the water profile to affect the levee.

The potential flows associated with the supplemental water alternative (Alternative A) of 1,615 cfs are anticipated to be released for a short period (2 days). The MEI study indicates that water profile associated with releases similar to the supplemental water alternatives would not rise above the levee toe (MEI 2000a). The impact to the levee integrity by releases of 1,615 cfs would have no significant impact to the levee structural integrity.

It appears that none of the alternatives evaluated in this EA/IS would pose a threat to the levee and supporting foundation for the short term and, therefore, are considered to have no impact to

levee integrity. As pilot project vegetation matures over the long term, trees may establish in the areas near or on the levee slopes. In problem locations levee stability may be affected by vegetative root zones. Impacts would be mitigated by controlling the structure of vegetation and preventing mature tree establishment in problem locations. See Section 2.2.3.3 for discussion of monitoring activities to address vegetation control.

The river channel is dynamic and meanders within the floodway contained by the flood control levees. In the past during high flows in the San Joaquin River, the overflow banks have experienced severe erosion and scour. In places, the erosion has migrated towards the levees causing levee failure. The proposed project's encouragement of riparian vegetation along the corridor on either side of the low flow channel may have a beneficial impact of stabilizing the migration of the river channel and preventing impacts to the levees. It is recommended that in problem areas if the low flow river channel abuts the levee toe, the channel should be receded or realigned away from the levee in order to maintain a safety buffer zone before the vegetation regenerates along the relocated channel.

3.3 BIOLOGICAL RESOURCES

3.3.1 Affected Environment

Biological resources in Reach 2 of the proposed project consist of two main components which include riparian vegetation and wildlife species that are found along the project reach from Gravelly Ford to the Mendota Pool (San Joaquin RM 229-205). Reach 2 is sand-bed dominated with many channel bars and extensive channel braiding. In the upper 10 miles of the reach, mature riparian vegetation is sparse or absent due to dry channel conditions during late summer and scour during winter flows. Backwater and shallow ground water associated with the Mendota Pool help to support a narrow band of vegetation along the lower few miles of the proposed project reach (J&S 1998). In addition, the LSJLD removes vegetation regularly from Gravelly Ford to Chowchilla Bypass. The existing distribution and extent of riparian vegetation is mapped and described in *Historical Riparian Habitat Conditions of the San Joaquin River* (J&S 1998). This report contains tables and graphs showing major cover types and their acreage of cover. In 1993, the aerial extent of riparian vegetation in Reach 2 was determined to comprise 283 acres (J&S 1998).

Dominant riparian vegetation found in the proposed project reach in the fall of 1998 were primarily mature trees located in the floodway and instream areas and include Goodding's black willow (*Salix gooddingii*), Fremont cottonwood (*Populus fremontii*), red willow (*Salix laevigata*), narrow-leaved willow (*Salix exigua*) and arroyo willow (*Salix lasiolepis*) (SJRRHRP 1998). In addition, mature Fremont cottonwood and sycamore trees were found along the river in Reach 2 outside levees and where levees are not present. A few seedlings and saplings of these native riparian trees were also found. Blue elderberry (*Sambucus mexicana*) are found along the San Joaquin River primarily between Chowchilla Bypass and San Mateo Avenue. Special-status plant species potentially occurring in the project vicinity and their habitats are listed and described in Table 1 (Appendix C).

Most seedlings and saplings observed in the fall 1998 survey were found on moist, depositional sandbars within one foot of the low-flow water surface (SJRRHRP 1998). Saplings and young trees were rarely found on upper floodplain terraces that supported other mature woodland communities. Some Freemont cottonwood seedlings were found approximately 6-12 inches above the low-flow water surface on sandy or sandy-gravel substrate within the project reach (SJRRHRP 1998). However, older Fremont cottonwood saplings and other young riparian scrub were not found. Willow saplings occurred sporadically on low point bars within the channel. Also, a few western sycamore (*Platanus racemosa*) saplings were found in the project reach.

Beginning July 3, 1999**,** the 1999 pilot project released a daily maximum of 800 cfs of water from Friant Dam reaching a total of 33,000 acre-feet by project completion in October 1999. Recruitment of native riparian seedlings in Reach 2 occurred at an average elevation of 0.16 meter above the low flow channel (Project Planning Workshop Summary 2000). Most seedling recruits were Goodding's black willow. Very few Fremont cottonwood seedlings were observed. Overall mortality of 1999 seedlings between September 1999 and April 2000 was approximately 50 percent and was negligible for older seedlings/saplings (Project Planning Workshop Summary 2000 and Arroyave 2000, pers. comm.). More detailed data and results from this 1999-2000 vegetation study will be available in future reports. It appears that the 1999 pilot project was successful in promoting riparian seed dispersal, seedling recruitment, and seedling/sapling establishment (of 1998 and 1999 seedlings).

Factors limiting native riparian plant recruitment and establishment include suitable, upstream/upwind seed sources; sufficient river flow and/or wind to disperse seeds during the spring and summer; timing and pattern of water delivery and channel scouring; and presence of a high, persistent water table (shallow ground water) in the stream and adjacent floodplains, resulting in adequate soil moisture (Scott et al. 1993). Native riparian plant species disperse their seeds over 2 to 6 weeks in the spring and summer months. However, these seeds most reach suitable germination sites soon after they are released or they will loose germanibility. Preliminary seed release surveys indicate that Fremont cottonwood trees upstream of Reach 2 began to release seeds in April 2000 (Arroyave 2000, pers. comm.). It is predicted that Goodding's black willow and sandbar willow trees located upstream of Reach 2 will begin to release seeds in late May or early June.

Several nonnative plant species are known to grow within the proposed project reach, including tamarisk (*Tamarix* spp.), giant reed (*Arundo donax*), scarlet wisteria (*Sesbania punicea*), tree tobacco (*Nicotiana glauca*), and eucalyptus (*Eucalyptus* spp.) (SJRRHRP 1998). Currently, existing populations of these species within the proposed study reach have not been surveyed or mapped. Sandbar willow shrubs and giant reed (*Arundo donax*) have been removed manually by the LSJLD to alleviate channel constrictions created by dense growth of this vegetation (SJRRHRP 1998). Although removal of the invasive giant reed has not been extensive in the past few years, it has been aggressive in the past. Vegetation clearing by the LSJLD in the proposed project reach has not occurred in the last 15-20 years due to the inability of getting permits for this clearing.

Wildlife found within the project vicinity are associated primarily with the riparian zone and include: fox, coyote, badgers, skunks, opossum, and birds, which feed on aquatic and terrestrial insects, reptiles, amphibians, squirrels, rabbits, and rodents. Special-status wildlife species with potential to occur in the project vicinity are their associated habitats are listed described in Table 2 (Appendix C).

3.3.2 Environmental Consequences

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS?	❑	❑	❑	■
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or the USFWS?	❑	❑	❑	■
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	❑	❑	❑	■
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	❑	❑	❑	■

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation or ordinance?	❑	❑	❑	■
f) Conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan?	❑	❑	❑	■

a) Substantial adverse effects to special-status species are not anticipated for Alternatives A, B, or C. However, several beneficial effects for special-status species wildlife would be possible if Alternative A or B is implemented. Refer to Tables 1 and 2 for a list of special-status species that potentially occur in the project vicinity (Appendix C).

b) Substantial adverse effects on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game (CDFG) or the USFWS would not occur by implementing Alternatives A, B or C. Benefits to native riparian plant communities are anticipated for Alternatives A and B.

c) Alternatives A, B, or C would not have substantial adverse effects on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

d) Alternatives A, B, and C would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident, or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

e) No conflicts are anticipated with any local policies or ordinances protecting biological resources, such as a tree preservation or ordinance, associated with Alternatives A, B, or C.

f) Alternatives A, B, and C would not conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plans.

3.3.2.1 Establishment Flow - Alternative A

The supplemental water alternative consists of an addition of 59,320 acre-feet of water to be released to the project reach from Friant Dam between June 9 and October 1, 2000. The following is a discussion of benefits to special-status wildlife species, special-status native vegetation, and nonnative vegetation with regard to Alternative A. The benefits would not be

significant due to the short-term, temporary application of the water and potential flood hazard mitigation measures for vegetative maintenance.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) inhabits riparian communities with elderberry shrubs (*Sambucus* spp.) below 3,000 feet throughout the Central Valley of California. It is listed as federally threatened by the USFWS (Table 2, Appendix C). As larvae and pupae, these beetles live in the spongy pith of mature elderberry stems, trunks, and roots (Thelander 1994). The adult beetles roam elderberry trees, eating leaves and flowers, until late June. In early summer, females mate and lay eggs on the elderberry shrubs again. A population of valley elderberry longhorn beetles was reported for a stand of elderberry shrubs upstream of Reach 2 at the San Joaquin RM 245 (Thelander 1994). Planned water releases and increased baseflows by Alternative A may promote growth of elderberry shrubs found throughout the project area, in which the valley elderberry longhorn beetle lives. This increased elderberry growth would result in a benefit for the beetle.

Blunt-nosed Leopard Lizard

The blunt-nosed leopard lizard (*Gambelia silus*) prefers open areas with scattered low bushes on alkali flats, low foothills, canyon floors, plains, washes, and arroyos (from 30-730 meters elevation) (Thelander 1994). It lives in the shallow burrows of other small mammals. It is both federally and state endangered. The blunt-nosed leopard lizard is primarily insectivorous, but occasionally supplements its diet with small lizards. Several occurrences of the lizard have been reported in upland habitats in the vicinity of the proposed project near Mendota Pool (Table 2, Appendix C). Alternative A would not affect the lizard or its habitat since it lives primarily in open, upland areas.

Giant Garter Snake

The giant garter snake (*Thamnophis gigas*) spends most of its life hidden in thickets of tules, weeds and willows that line freshwater marshes, flooded rice fields, ditches, and stream channels (Thelander 1994). From late October to late March the snake hibernates in abandoned rodent burrows located above the high water line. It hunts primarily by day for small fish, tadpoles or frogs in the water. The giant garter snake is federally and state threatened. Several occurrences of the giant garter snake were reported for the San Joaquin River in the Mendota Wildlife Area (Table 2, Appendix C). Alternative A would not likely create more open water habitat and thus would not adversely affect or benefit the giant garter snake.

Swainson's Hawk

Swainson's hawk (*Buteo swainsoni*) nests in large oaks (*Quercus* spp.), willows (*Salix* spp.) and cottonwoods (*Populus* spp.) in or near riparian communities (Thelander 1994). It forages and breeds in expansive areas of adjacent grasslands, irrigated pastures, and grain fields. Swainson's hawk preys on small mammals, birds, and insects. It lives in these habitats from early March to

early September, after which it migrates south for the winter months. The Swainson's hawk is listed as threatened by the CDFG. Nesting pairs of Swainson's hawks were reported to occur near Mendota Pool in the vicinity of the proposed project (Table 2, Appendix C). Alternative A would benefit the Swainson's hawk indirectly by increasing riparian habitat and cover for its prey.

Western Yellow-Billed Cuckoo

The western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is a migratory bird that inhabits wide, dense willow and cottonwood forests and nests in thick willow understories (Thelander 1994). It forages primarily in cottonwood thickets, feeding on catapillars, grasshoppers, cicadas, other large insects, and frogs. The western yellow-billed cuckoo requires dense, low foliage (usually willows) of more than 25 acres for nesting (Thelander 1994). It breeds in California from late May to June and stays until late August or September. The western yellow-billed cuckoo was designated as endangered by the CDFG in 1988 (Table 2, Appendix C). Nesting sites have been reported near Mendota Pool in the vicinity of the proposed project site. Alternative A would not likely create dense willow thickets in which the cuckoo nests. Thus, Alternative A would not have a substantial adverse effect or benefit on the western yellow-billed cuckoo.

Bank Swallow

The bank swallow (*Riparia riparia*) nests in large colonies that burrow in vertical banks made of fine-textured sand near streams, lakes and oceans (Thelander 1994). This migratory bird breeds in California from late March to early September. The bank swallow is listed as threatened by the CDFG. Reports of the bank swallow indicate that bank swallows occur near Mendota Pool in the vicinity of the proposed project (Table 2, Appendix C). Alternative A would benefit the bank swallow if additional riparian vegetation growth promotes insect abundance. In addition, maintenance of baseflows would provide drinking and bathing water for this species.

San Joaquin Antelope Squirrel

The San Joaquin Antelope Squirrel (*Ammospermophilus nelsoni*) lives on dry, sparsely vegetated loamy soils from 200-1,200 feet in elevation. It prefers widely scattered shrubs, forbs, and grasses in terrain containing gullies and washes (Thelander 1994). From December to mid-April, the San Joaquin antelope squirrel eats primarily green vegetation but feeds on insects for the remainder of the year (Thelander 1994). The San Joaquin antelope squirrel is listed as threatened by the CDFG. No occurrences of the San Joaquin antelope squirrel are recorded. Only very small, fragmented patches of habitat suitable for the San Joaquin antelope squirrel exist in the project reach at this time (Wolfe 2000, pers. comm.). Since the squirrel does not typically persist in fragmented and disturbed habitats, it most likely does not occur in the project reach. Thus, the San Joaquin antelope squirrel would not benefit or be adversely affected by Alternative A.

Fresno Kangaroo Rat

The Fresno kangaroo rat (*Dipodomys nitratoides exilis*) inhabits alkali marsh and sink communities from 200 to 300 feet in elevation only in Fresno County. It feeds on plant seeds and small green vegetation. The Fresno kangaroo rat is designated as endangered by the USFWS and considered extinct in this area by the CDFG (Single 1999, pers. comm.). Thus, Alternative A would not adversely affect the Fresno kangaroo rat.

Riparian Woodrat

The riparian (or San Joaquin Valley) woodrat (*Neotoma fuscipes riparia)* inhabits live oaks, other thick-leaved trees and shrubs, and occasionally deciduous valley oaks (Williams et al. 1997). They are most abundant in areas of dense shrub cover. Riparian woodrats found in riparian communities are primarily found in willow thickets with oak overstories. The riparian woodrat builds terrestrial houses of sticks and litter, placing them in dense brush on the ground against logs, exposed roots, or cavities of threes. They are primarily generalist herbivores, consuming nuts, fruits, fungi, and forbs (Williams et al. 1997). This species is both federally and state listed as endangered. No known or documented occurrences of the riparian woodrat have been reported in the project reach. The only population verified since 1938 in located in a riparian forest on the Stanislaus River. Alternative A would not adversely effect the riparian woodrat, since it can avoid high water by climbing in trees. This alternative would probably not benefit the riparian woodrat habitat in the short term; willow density and cover in which it nests would not increase sufficiently.

Riparian Brush Rabbit

The riparian brush rabbit (*Sylvilagus bachmani riparius*) was historically found in the brush understory of riparian forests along the San Joaquin River. They forage in small openings in riparian brush canopy, feeding on herbaceous vegetation such as grasses and clover. Currently, only one population is known to exist on the Stanislaus River in southern San Joaquin County (Williams et al. 1997). Locations in which riparian brush rabbits are found typically have roses (*Rosa* sp.), blackberries (*Rubus* sp.), marsh baccharis (*Baccharis douglasii*), and grape vines (*Vitis* spp.) (Williams et al. 1997). This species is both federally and state listed as endangered. Alternative A would not have substantial adverse effects on the riparian brush rabbit habitat. No benefits are anticipated with this alternative; due to its short-term nature, a thick brushy riparian understory habitat for the riparian brush rabbit would not be created.

San Joaquin Kit Fox

The San Joaquin kit fox (*Vulpes macrotis mutica*) is known to occur primarily in the San Joaquin Valley and the foothills to the west. This species is federally endangered and listed as threatened by the State of California. The San Joaquin kit fox prefers sparse, open vegetation including saltbush scrub, grassland, oak, savanna, and freshwater scrub habitats in its natural habitat (Thelander 1994). It dens mostly in open areas except in highly disturbed areas such as towns and oil fields that are not vegetated, in which case it creates dens behind thick vegetation.

Otherwise, kit fox dens are located in open areas with high visibility. The only reported occurrence of the kit fox near the project reach was in an upland area approximately 12 miles east of Mendota. Thus, Alternative A would not adversely affect the San Joaquin kit foxes, since they do not live in riparian forests in the project vicinity where their dens may be flooded.

Native Riparian Plants

If Alternative A is implemented, native riparian plants should increase in frequency of occurrence and density within the proposed project reach. Recruitment of native riparian plants to the project reach would depend on an available upstream seed source and a suitable dispersal mechanism. The stream reach (Reach 1) immediately upstream of the proposed project reach, from Friant Dam to Gravelly Ford, exhibits a nearly continuous cover of native riparian vegetation that would provide a suitable seed source for dispersal. Dominant, native riparian trees found from Friant Dam to Mendota Pool (Reaches 1 and 2) produce and disperse seeds during the spring and summer months from March to early June. Proposed water releases in the summer months (June 9 – October 1) according to Alternative A, would provide a dispersal mechanism and, thus, promote recruitment for some native riparian species (primarily willow species). Successful establishment and growth of native, woody riparian species would depend on the associated maintenance of levels in the floodplain to provide adequate moisture for the plants to live. Flood flows of greater than 2,200 cfs are though to cause scoring that may impede young riparian seedling establishment (Arroyave 2000, pers. comm.). The type and extent of nonwoody (herbaceous and scrubby) vegetation within and upstream of the project reach is unknown at this time. If suitable seed sources are located upstream of the project reach, recruitment, establishment, and growth of those nonwoody riparian plants may benefit from Alternative A. Supplemental water releases proposed by Alternative A would benefit recruitment, establishment, and growth of native woody and nonwoody riparian species. Beneficial effects may be reduced if monitoring shows that vegetative maintenance is necessary to reduce flood hazards.

Nonnative Plants

Several nonnative, invasive, perennial plant species may be recruited due to supplemental summer water releases and base flows provided to the proposed project reach of the San Joaquin River, under Alternative A. However, native riparian plants would exhibit a competitive advantage over nonnative, drought-tolerant plant species and outcomplete nonnative plants if water is not limiting. Thus, Alternative A may benefit native riparian plants, but the benefit is small for a 1-year project. Giant reed may potentially recruit vegetatively after high flows recede in areas where native plants are not established. Likewise, seeds of tamarisk species are dispersed from April – August and may also recruit in the drawdown period. Many annual, nonnative (aquatic and riparian) plant species (i.e., perennial water hyacinth [*Eichhornia crassipes*] and scarlet wisteria [*Sebania punicea*]) may also recruit to the project reach due to supplemental flows associated with Alternative A. The River Parkway Trust is currently conducting a removal effort upstream of the project reach. However, scarlet wisteria produces prolific seed and propagates readily; thus, supplemental flows may help spread this plant

downstream. The monitoring program would help to identify areas where manual removal of this weedy species may be necessary.

3.3.2.2 Maintenance Flow – Alternative B

Alternative B would entail maintaining conditions along the project reach that occurred in 1999 by releasing 18,400 acre-feet of water from June 9 to October 1, 2000. Baseflows would be maintained at 280 cfs after peak water releases recede. No substantial adverse effect would occur if Alternative B were implemented. Small benefits to biological resources associated with this proposed action are described below. Alternative A would be more beneficial to plants and animals located within the project reach than would Alternative B. The benefits would not be significant due to the short-term, temporary application of the water and potential flood hazard mitigation measures for vegetative maintenance.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle would not be adversely affected by and may benefit from Alternative B due to any increased growth in elderberry bushes, which it inhabits.

Blunt-nosed Leopard Lizard

Flows proposed for Alternative B would not adversely affect or benefit the blunt-nosed leopard lizard.

Giant Garter Snake

The giant garter snake habitat would not be increased due to proposed maintenance flows in the project reach. This alternative would not adversely affect or benefit the giant garter snake.

Swainson's Hawk

Swainson's hawk could indirectly benefit from maintenance flows (Alternative B) by providing some growth of riparian cover for its prey to live. The benefit is small due to the short term of the proposed action (1 year) and the uncertainty about how much cover growth would occur.

Western Yellow-billed Cuckoo

Alternative B would not have a substantial adverse effect on the western yellow-billed cuckoo since it prefers to nest in mature cottonwood forests with thick willow understories.

Bank Swallow

Alternative B may benefit the bank swallow; insect abundance (food) may be increased by additional riparian vegetation growth due to proposed maintenance flows. In addition, maintenance of baseflows would provide additional drinking water and bathing water for this bird.

San Joaquin Antelope Squirrel

The San Joaquin antelope squirrel would not be adversely affected or benefit from implementation of Alternative B.

Fresno Kangaroo Rat

Alternative B would not adversely affect or benefit the Fresno kangaroo rat, since it is thought to be extinct in the project reach.

Riparian Woodrat

Alternative B would not adversely affect or benefit the riparian woodrat.

Riparian Brush Rabbit

The riparian brush rabbit would not be adversely affected by or benefit from implementation of Alternative B.

San Joaquin Kit Fox

Since the San Joaquin kit fox does not live in riparian communities affected by the proposed action, Alternative B would not adversely affect or benefit the fox.

Native Riparian Plants

Maintenance of native woody riparian plants may benefit from Alternative B. Alternative B could also promote establishment of native, nonwoody riparian plants that have suitable upstream seed sources. Location of seedlings, however, would be lower in elevation than if Alternative A were implemented due to less water under Alternative B (lower in elevation than the 1999 recruits established at 0.16 meter above the low flow channel). Proposed baseflows associated with this alternative may support the survival and establishment of young, established seedlings (1998 and 1999 recruits) in the proposed project reach. Beneficial effects may be reduced if monitoring shows that vegetative maintenance is necessary to reduce flood hazards.

Nonnative Plants

Similar to Alternative A, maintenance flows planned for the dry summer months (according to Alternative B) would give native riparian vegetation a competitive advantage over nonnative species. Thus, native riparian plants may benefit from Alternative B. However, some nonnative plant species may establish in drawdown periods or after scouring of native plants by large flood flows.

3.3.2.3 No-Action – Alternative C

Alternative C, the No-Action Alternative, would consist of reverting back to standard operating conditions with no summer flows in the project between Gravelly Ford and Mendota Pool. No substantial adverse effects would occur to the special-status species (valley elderberry longhorn beetle, blunt-nosed leopard lizard, giant garter snake, Swainson's hawk, western yellow-billed cuckoo, bank swallow, San Joaquin antelope squirrel, Fresno kangaroo rat, riparian wood rat, riparian brush rabbit, or the San Joaquin kit fox) if this alternative were implemented.

Native Riparian Plants

Seed dispersal of native riparian plant species (woody and nonwoody) would be limited by Alternative C due to lack of flow for adequate dispersal during spring and summer months when native riparian species disperse seed. Also, first year riparian seedlings established during the 1999 pilot project may not survive without sufficient shallow ground water levels (flow) to support their continued growth.

Nonnative Plants

Tamarisk and giant reed are nuisance species on other perennial and intermittent streams in California's Central Valley. These and other nonnative species have invaded native riparian vegetation and caused serious floodway capacity and hydraulic problems due to their dense growth pattern, vegetative reproduction success, and post-fire recovery. They are able to tolerate a wide range of environmental conditions, and spread readily during/after drought, flood scour, fire, and nonselective mechanical vegetation removal.

Increases in nonnative, invasive tree and shrub species density may occur within the proposed project reach due to their greater tolerance to drought and disturbance than native species. If No-Action is taken, nonnative, nuisance species populations may outcompete native species, establish, and expand in open areas where native seedling are not able to survive due to lack of ground water. *Tamarix* spp. are trees with very deep roots that can lower water table elevations along streams and rivers. If established, *Tamarix* spp. may outcompete native trees and shrubs along the proposed project reach due to the already dry conditions that would occur according to No-Action. *Arundo donax* is a large, invasive grass species that has deep roots and is highly successful at reproducing vegetatively from plant parts (Rieger and Kreager 1989). Areas of the proposed project reach in which either of these species is present would be prone to invasion (especially after natural flood events) if Alternative C were implemented. Of highest risk of

invasion are areas downstream of existing populations where moist bars and floodplains have little or no ground cover (i.e., no native riparian plant cover) and overstory trees that provide shade. The monitoring program would assist in identifying whether this increase would occur in 2000, following wet conditions since October 1997. In addition, the nonnative scarlet wisteria has rapidly spread through the upper end of the project reach.

3.4 ENERGY RESOURCES

3.4.1 Affected Environment

There are a total of three hydroelectric powerplants located at the base of Friant Dam. A fourth, much smaller powerplant is located slightly downstream at a fish hatchery. The three larger facilities were placed in service in 1986 by the Friant Power Authority to generate hydroelectric power from the water released from Friant Dam. They are operated under a license granted by the Federal Energy Regulatory Commission. The Friant Power Authority is made up of a number of irrigation districts that obtain water from storage at Millerton Lake, the body of water created by Friant Dam.

Water is released at Friant Dam to:

- The San Joaquin River via a fish hatchery and associated powerplant downstream from the dam;
- Directly to the San Joaquin River through the River Outlet Powerhouse;
- The Madera Canal for irrigation use north of the dam via the Madera Powerhouse; and
- The Friant-Kern Canal for irrigation use south of the dam via the Friant-Kern Powerhouse.

In addition, valves are provided at each of these locations to make releases above the capacity of the power generating facilities. The power generated at each of these facilities is directly proportional to the flow passing through the powerplant's turbine and is also directly proportional to the difference in water elevation (or head), between the upstream reservoir and the downstream release point. In addition, the amount of water that can pass through the turbine is a function of the head. Thus, as the reservoir water surface is lowered, energy production is adversely affected in two ways, first because the head is lower, and secondly because not as much water can go through the turbine.

The three powerplants operated by the Friant Power Authority at Friant Dam have a maximum total capacity of about 32,000 kilowatts. This is approximately sufficient to serve the household needs of 32,000 people. Total generation at these three facilities varies greatly from month to month and from year to year. The maximum historical generation in a year was 137.2 million kilowatt hours in 1995. The minimum historical generation in a year was 25.5 million kilowatt hours in 1987.

In general, generation at the River Outlet Plant is relatively steady. Releases are made throughout the year to meet existing stream maintenance requirements. Production falls off as

the reservoir is lowered. However, the river outlet is located at the lowest point of the dam, and so the head variation is relatively minor. For much of the year, this facility operates at the hydraulic capacity of the turbine. The two powerplants located on the canals have a much greater variation in output. Releases vary with irrigation need and water availability. In addition, the reservoir drawdown has a much greater effect on generation. See Table 3.4-1 following.

Table 3.4-1 Friant Powerplants: Range in Operating Head

Powerplant	Capacity (kilowatts)	Head (full reservoir)	Head (low reservoir)	Minimum Head To Operate
River Outlet	2,200	265 feet	168 feet	Not Applicable
Madera	10,000	130 feet	33 feet	40 feet
Friant-Kern	20,000	107 feet	10 feet	30 feet

The Friant Power Authority sells the power it produces to Pacific Gas and Electric. The price paid varies hourly depending on daily and seasonal demands in accordance with the terms of Pacific Gas and Electric's standard offer number 4. In 1999, the average price paid to Friant Power Authority varied from $0.03301 per kilowatt-hour in March to $0.06030 per kilowatt-hour in September.

3.4.2 Environmental Consequences and Mitigation

The 2000 Pilot Project could adversely affect hydroelectric generation at Friant in two ways. First, water released to the river would not be available for generation at the canal powerhouses. It also would not be available for generation at the River Outlet Powerhouse because that turbine would already be at full hydraulic capacity during the period proposed for increased releases to the San Joaquin River.

Secondly, if water for the 2000 Pilot Project is taken from Millerton Reservoir without an immediate matching reduction in releases to the irrigation canals, there would be a reduction in reservoir storage, resulting in a reduction in head acting on the units, and thereby a reduction in energy output. (As a result of the 1999 pilot project, the reservoir elevation was lowered by over seven feet in September from its originally planned elevation before it was gradually restored to its originally planned elevation in February 2000.) Under Alternative B, less water would be taken from the reservoir than occurred previously, only 10,800 acre-feet of Class 1 water supply.

The reduction in output would result in a reduction in revenue to the Friant Power Authority. It may also result in the need for fossil fuel produced energy or energy from other sources to offset any loss in the energy produced at the site.

Reclamation makes forecasts of predicted reservoir operations on a monthly basis based on a number of factors including existing storage in the system of reservoirs, snowpack and contract

delivery requirements. As of June 2, 2000, Reclamation has estimated that facilities at Friant Dam would be operated as follows for the No Project Alternative (Alternative C) based on projected inflows of 1.26 million acre-feet through July.

Table 3.4-2 Forecast Irrigation Releases and Millerton Reservoir Operation May 2000 - Feb. 2001

Month	Release to Friant-Kern Canal (acre-feet)	Release to Madera Canal (acre-feet)	End of Month Storage at Millerton (acre-feet)
May 2000 (actual)	250,000	47,000	511,500
June	195,000	47,000	497,400
July	234,000	56,000	295,300
August	150,000	45,000	211,800
September	69,000	22,000	222,200
October	48,000	17,000	227,500
November	25,000	3,000	236,000
December	3,500	0	278,700
January 2001	6,000	0	314,900
February	40,000	0	334,200

These data have been used to estimate energy production at the Friant-Kern and Madera Powerhouses for the No-Action Alternative (Alternative C). In addition, the potential effects of the Establishment Flow (Alternative A) and Maintenance Flow (Alternative B) Alternatives were examined from two scenarios:

1. First, it was assumed that any increase in release for maintenance or supplemental water flows would result in an immediate matching reduction in releases to the Friant-Kern Canal. Therefore, there would be no effect on the operating head.

2. Secondly, it was assumed in the Draft EA/IS that the establishment or maintenance water flows would result in a combination of a reduction of releases to the Friant-Kern Canal, and a temporary reduction in storage in Millerton Reservoir. In fact in the 1999 pilot project, the reduction in Millerton Reservoir storage was not fully restored until February 2000. This was found to have had a significant negative impact on energy production. Therefore, restrictions have been included in this 2000 Pilot Project to mitigate this potential negative impact and allow no effect on storage at Millerton Reservoir.

Analysis of the energy generation impacts shows minimal difference between the two scenarios given these restrictions.

The average value of energy during the period affected by the 1999 pilot project was $0.056 per kilowatt-hour. Due to a general increase in energy prices, we have projected a value of $0.06 per kilowatt-hour for the 2000 Pilot Project.

The results of the energy generation calculations in terms of kilowatt-hours and dollars are presented in Table 3.4-3 following. It should be noted that these estimates are based on projected reservoir operation as indicated in Table 3.4-2. These estimates will require adjustment when actual data are available.

As shown in Table 3.4-3, an increase in releases to the river results in a minor decrease in generation at the Friant power plants. The decrease has been minimized by runoff conditions predicted for water year 2000. First, heavy June releases are predicted because of continued heavy runoff with a nearly full reservoir. This delays the need to implement the Pilot Project until July. Second, the reservoir storage will be maintained at planned originally targeted levels. In May 2000, water that otherwise would have been released to this river to meet flood control restrictions was provided to several participating irrigation districts. This water was "banked" in ground water and will be used during the period of the Pilot Project in lieu of reducing water levels in the reservoir. These releases had the added benefit of increasing generation in May, thereby offsetting the minor losses predicted for the Pilot Project.

Table 3.4-3 Projected Energy Generation for 2000 Pilot Project Alternatives, July - September 2000

Alternative	Projected Energy Generation (Jun 00-Feb 01)			Difference in Energy (GWh)	Difference in Revenue ($)
	Friant-Kern (GWh)	Madera (GWh)	Total (GWh)		
C (No-Action)	16.8	7.5	24.3	-	-
A (Establishment Flow)	16.8	7.2	24.0	(0.3)	($18,000)
B (Maintenance Flow)	16.8	7.2	24.0	(0.3)	($18,000)

3.5 OTHER RESOURCES

This section discusses other environmental resources contained in the CEQA environmental checklist. Most of these resources are not affected significantly by the proposed action alternatives or are less than significant with mitigation incorporation, and the reasons are provided in the discussion section following each checklist.

3.5.1 Aesthetics

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Have a substantial adverse effect on a scenic vista?	❑	❑	❑	■
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	❑	❑	❑	■
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	❑	❑	❑	■
d)	Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	❑	❑	❑	■

Discussion: The 2000 Pilot Project (Alternatives A and B) would have a small beneficial effect on views of the river in Reach 2. There are no construction or land-altering activities that could adversely affect the visual character of the affected portions of the river.

3.5.2 Agriculture Resources

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural land?	❑	❑	❑	■
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	❑	❑	❑	■
c)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non agricultural use?	❑	❑	❑	■

Discussion: How the water for the proposed releases would be obtained could affect existing farmland in the short term. Water purchases under Alternatives A and B would not result in additional land fallowing due to farmers potentially selling water for the proposed action and then subsequently fallowing land. See Section 2.2.3.2. Of potential concern over the long term is the potential effect on the flood control channel and whether additional farmland would be needed for flood protection through acquisition of easement to widen the channel. A mitigation measure explained in Section 2.2.3.3 addresses the short term potential for undesirable vegetation.

3.5.3 Air Quality

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Conflict with or obstruct implementation of the applicable air quality plan?	❑	❑	❑	■
b)	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	❑	❑	❑	■
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceeded quantitative thresholds for ozone precursors)?	❑	❑	❑	■
d)	Expose sensitive receptors to substantial pollutant concentrations?	❑	❑	❑	■
e)	Create objectionable odors affecting a substantial number of people?	❑	❑	❑	■

Discussion: There are no construction of land-altering activities associated with the 2000 Pilot Project Alternatives A and B, nor would there be significant changes in physical operations that could affect air quality.

3.5.4 Cultural Resources

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	❑	❑	❑	■
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	❑	❑	❑	■
c)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	❑	❑	❑	■
d)	Disturb any human remains, including those interred outside of formal cemeteries?	❑	❑	❑	■

Discussion: There are no construction or land-altering activities associated with the proposed action alternatives. The main issue would be the protection or exposure of cultural resources due to altered reservoir levels or river flows. The operation of Lake Millerton would be within previously experienced conditions wherein the reservoir is drawn down during the summer and refills during the winter and spring. Reservoir storage will not be allowed to drop by more than 10,000 acre-feet or 2.5 feet in water surface elevation, and these reductions will not be allowed between August 1 and September 30, 2000 (Section 2.2.3.1) Increased flows in the San Joaquin River in the June-October period would not cause increased exposure of potential cultural resources.

3.5.5 Geology and Soils

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	❑	❑	❑	■
i)	Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	❑	❑	❑	■

	Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
ii)	Strong seismic ground shaking?	❑	❑	❑	■
iii)	Seismic-related ground failure, including liquefaction?	❑	❑	❑	■
iv)	Landslides?	❑	❑	❑	■
b)	Result in substantial soil erosion or the loss of topsoil?	❑	❑	❑	■
c)	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	❑	❑	❑	■
d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	❑	❑	❑	■
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of waste water?	❑	❑	❑	■

Discussion: There are no construction or land-altering activities associated with the 2000 Pilot Project. Under most of the water supply options, canals and reservoirs would be operated within normal ranges and not result in substantial soil erosion. See Section 3.2.2.6 for a discussion of levee integrity.

3.5.6 Hazards and Hazardous Materials

	Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	❑	❑	❑	■
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the	❑	❑	❑	■

	Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
	environment?				
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	❑	❑	❑	■
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	❑	❑	❑	■
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	❑	❑	❑	■
f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	❑	❑	❑	■
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	❑	❑	❑	■
h)	Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	❑	❑	❑	■

Discussion: There are no construction or land-altering activities associated with the proposed action Alternatives A and B. There is no storage or transport of hazardous materials associated with the water release operations.

3.5.7 Land Use and Planning

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Physically divide an established community?	❑	❑	❑	■
b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	❑	❑	❑	■
c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	❑	❑	❑	■

Discussion: The 2000 Pilot Project Alternatives A and B would not affect land use and planning in that no new stream courses or alternative stream courses are proposed. All flows would occur within the existing river corridor. Riparian enhancement is consistent with county planning policies for resource conservation. There are no formally adopted habitat conservation plans for the affected portions of the San Joaquin River.

3.5.8 Mineral Resources

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	❑	❑	❑	■
b)	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	❑	❑	❑	■

Discussion: There are no construction or land development activities associated with the proposed action alternatives, which are typically the activities that could impact mineral resources. Existing sand and gravel mining operations would not be affected by additional

maintenance flow, as these operations were not interrupted by the 1999 pilot project flows. Energy resources from hydropower are discussed in Section 3.4.

3.5.9 Noise

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project result in:					
a)	Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	❑	❑	❑	■
b)	Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	❑	❑	❑	■
c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	❑	❑	❑	■
d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	❑	❑	❑	■
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	❑	❑	❑	■
f)	For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	❑	❑	❑	■

Discussion: There are no construction or land development activities, nor would there be any significant increases in pumping or generator use that would affect sensitive land uses (residential, schools, nursing homes). Additional flows in the San Joaquin River from additional releases at Friant Dam would not substantially raise background noise levels, violate noise standards, or contribute adversely to community noise levels.

3.5.10 Population and Housing

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:				
a) Induce substantial growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	❑	❑	❑	■
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	❑	❑	❑	■
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	❑	❑	❑	■

Discussion: There are no land development activities associated with the 2000 Pilot Project Alternatives A and B, nor would there be any changes in operations that would require new construction or facilities. No water is being acquired to serve municipal or industrial uses. Therefore, the project alternatives would not affect population and housing nor induce urban growth.

3.5.11 Public Services

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	❑	❑	❑	■
Fire protection?	❑	❑	❑	■

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Police protection?	❑	❑	❑	■
Schools?	❑	❑	❑	■
Parks?	❑	❑	❑	■
Other public facilities?	❑	❑	❑	■

Discussion: There are no land development activities associated with the 2000 Pilot Project Alternatives A and B. There is no housing or employment growth associated with the water releases, so there is no impact on public service levels or standards.

3.5.12 Recreation

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	❑	❑	❑	■
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	❑	❑	❑	■

Discussion: The potential water releases for riparian habitat restoration would not increase recreational uses in the project vicinity. The affected portions of the San Joaquin River are not used for boating and other intensive recreation uses. Water levels at Millerton Lake affect boat ramps, picnicking, and water sports such as skiing. By limiting drawdown for the 2000 Pilot Project to a maximum of 2.5 feet, and with no impacts to storage from the proposed water banking program, recreation activities would not be affected.

3.5.13 Transportation/Traffic

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	❑	❑	❑	■
b)	Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	❑	❑	❑	■
c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	❑	❑	❑	■
d)	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	❑	❑	❑	■
e)	Result in inadequate emergency access?	❑	❑	❑	■
f)	Result in inadequate parking capacity?	❑	❑	❑	■
g)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	❑	❑	❑	■

Discussion: There are no construction or development activities associated with the 2000 Pilot Project alternatives. Water releases would not affect housing or employment in the project area and vicinity, and there would be no significant effect on transportation facilities or traffic. Existing highway bridges would not be affected by scouring of piers and abutments from the preferred alternative (maintenance flow), which is an increase of 60 cfs over the baseline flow. Elderberry mitigation sites established by Caltrans are above the elevation of the channel where the flows occur.

3.5.14 Utilities and Services Systems

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	❑	❑	❑	■
b)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	❑	❑	❑	■
c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	❑	❑	❑	■
d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	❑	❑	❑	■
e)	Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	❑	❑	❑	■
f)	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	❑	❑	❑	■
g)	Comply with federal, state, and local statutes and regulations related to solid waste?	❑	❑	❑	■

Discussion: The proposed action does not result in additional quantities of wastewater or solid waste. Concerning the availability of sufficient water supplies, there is uncertainty in how the water would be made available has been clarified. See Section 2.2.2 for a description of the banking of flood releases in groundwater recharge facilities. Limitations on reservoir drawdown and on loss water purchases identified in Section 2.2.3 will avoid impacts to water supplies. Water would be obtained from willing sellers in the Friant Division through an exchange, and impacts to water users would be avoided.

3.6 INDIAN TRUST ASSETS

It is Reclamation's policy to protect Indian Trust Assets (ITAs) from adverse impacts of its programs and activities whenever possible. Types of actions which could affect ITAs include an interference with the exercise of a reserved water right, degradation of water quality where there is a water right, impacts to fish and wildlife where there is a hunting or fishing right, or noise near a land asset where it adversely impacts uses of the reserved land. (USBR 1997)

Approximately 11 reservations or rancherias are located in the counties that make up the San Joaquin River Region. In addition, there are also an unknown number of public domain allotments within the region.

Actions evaluated in this EA/IS are the management of water resources in the San Joaquin River from Friant Dam to Mendota Dam. It is expected that there would not be any adverse impacts to ITAs in the San Joaquin River Region. Increased or decreased flows would be within the normal floodplain of the affected reach and would not negatively affect any ITAs that may be located adjacent to the river.

3.7 ENVIRONMENTAL JUSTICE

This section addresses the concern of whether any group of people, including racial, ethnic, or socioeconomic group, would bear a disproportionate share of adverse environmental effects from implementation of the alternatives. Consideration of environmental justice is a federal requirement based on a Presidential Executive Order 12898; there is no corresponding requirement in CEQA.

To address environmental justice concerns, the following issues are evaluated:

- Are affected resources are used by a minority or low-income community?
- Are there minority or low-income communities disproportionately subject to environmental or human health impacts?
- Do the resources used for the project support subsistence living?

The San Joaquin River area contains high percentages of Hispanics and persons/families living below the poverty level. Unemployment is significantly higher in the project area and vicinity than in other regions of the State. Consequently, there is the potential for low-income and minority groups to be disproportionately affected. Since there are not human health impacts from any of the project alternatives (including the No-Action Alternative), any issues related to environmental justice are focused on potential socioeconomic impacts. Because the source of water would be a willing seller, and no additional lands would be taken out of production to make the water available (see Section 2.2.3), there would be no socioeconomic impact on minority or low-income groups.

3.8 CUMULATIVE AND OTHER MANDATORY FINDINGS OF SIGNIFICANCE

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:					
a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	❑	❑	❑	■
b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	❑	❑	■	❑
c)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	❑	❑	■	❑

Discussion:

a) The proposed action would improve the quality of habitat in the affected portion of the San Joaquin River, but this beneficial effect is short term and temporary in the absence of a multiyear commitment to water releases for habitat restoration. By limiting the drawdown to a maximum of 2.5 feet (water surface elevation), there would be no effect on cultural resources (if present in lakeside sediments exposed during drawdown) at Lake Millerton.

b) Cumulative impacts associated with water acquisitions and transfers are of concern to overall water management within the San Joaquin Basin. Reclamation has previously purchased water in the San Joaquin Valley from water rights holders to improve flows for fish and wildlife and for the wetland habitats. Water has also been purchased on an

annual basis by agricultural users. Under Alternative B, the contribution of water to Mendota Pool is very small due to losses of 90 percent.

Cumulative impacts from the proposed action in 2000 are associated with the reduction in water for other beneficial uses due to the commitment to riparian enhancement on the San Joaquin River system of an additional 18,400 – 59,320 acre-feet (now 10,800 acre-feet for the preferred alternative). Water acquisitions and transfers (including the proposed action) in the San Joaquin Valley for 2000 depend upon hydrologic conditions and include the following projects:

Project Name	Status	Annual Water Quality (AF)
1a. Wetland Enhancement Transfer by Exchange Contractors	Proposed by Reclamation	21,500 acre-feet
1b. Agricultural Water Transfer by Exchange Contractors	Approved by Exchange Contractors	43,000 acre-feet
2a. San Joaquin River Agreement	Approved by San Joaquin River Group Authority on February 19, 1999; Record of Decision signed April 12, 1999. Approved by SWRCB D-1641, December 28, 1999	110,000 Vernalis Adaptive Management Plan Flow 12,500 acre-feet October Flow 15,000 acre-feet from Oakland Irrigation District (any time during year)
2b. San Joaquin River Agreement Additional Water for Vernalis Adaptive Management Plan pulse flow, 2000	Proposed	47,000 acre-feet
3. South San Joaquin Irrigation District South County Water Supply Project	Proposed (2002-2020)	32,000 acre-feet (Phase I) 30,000 acre-feet Total
4. Oakland Irrigation District /South San Joaquin Irrigation District Water Transfer to Reclamation	Approved	30,000 acre-feet

These other projects total 279,000 acre-feet of water in 2000 (excluding project number 3).

Water acquisitions for fish and wildlife may reduce the ability of other agencies to purchase and transfer water in 2000. If the amount of water available for transfers is reduced by the proposed action's 10,800 acre-feet, then other users will either increase ground water withdrawals, use other methods, or pay more for water purchases. Since 2000 is expected to be an above normal year hydrologically (based on the San Joaquin

Region 60-20-20 Water Supply Index of 3.3 as of April 1, 2000), the impact to other users would be insignificant. There could be a cumulative benefit to fish and wildlife from the additional instream flows. Table 3.8-1 presents a regional summary.

Table 3.8-1 SUMMARY OF CUMULATIVE IMPACTS

Region	Actions Involved	Potential Cumulative Impacts from All Actions
Delta Region	• SWRCB Bay/Delta Process • Interim South Delta Program • Central Valley Project Improvement Act • CALFED Bay-Delta Program	• Beneficial and detrimental impacts to fisheries and Delta species listed as threatened or endangered • Beneficial and detrimental impact to water quality and supply availability
Sacramento River Region	• SWRCB Bay/Delta Process • Central Valley Project Improvement Act • CALFED Bay-Delta Program	• Beneficial impacts to fisheries and water quality • Adverse impact to water supply availability • Beneficial and/or adverse impacts to recreation
San Joaquin River Region	• SWRCB Bay/Delta Process • Central Valley Project Improvement Act • CALFED Bay-Delta Program • Interim South Delta Program • New Melones long-term plan of operation • South San Joaquin Irrigation District South County Water Supply Project • Oakland Irrigation District/ South San Joaquin Irrigation District Water Transfer to Stockton East Water District • SJRRHRP Pilot Project	• Beneficial impacts to water supply reliability and the protection of water rights • Beneficial and detrimental impact to water quality • Beneficial impact to riparian vegetation, special-status and other wildlife species • Long-term beneficial impacts to fisheries • Adverse impacts to agricultural production • Adverse impacts to ground water
State Water Project and CVP Service Areas	• All Projects Analyzed	• Adverse impacts to water supply availability and quality

Notes: * Actions have both negative and positive effects as indicated. The summary does not attempt to arrive at a net effect.

c) Limitations on the source of the water for the supplemental water releases mean some agricultural water users would not receive less water. Agricultural production would not be affected, so there is no adverse affect to existing water users unless farmland is acquired to increase the flood control channel or to construct new facilities over the long term. Of potential concern is the cumulative effect of any additional vegetation in the channel from the 2000 Pilot Project, growth of vegetation from the 1999 project, growth of pre-1999 vegetation, and other spreading of vegetation in the project area, and their potential effect on flood capacity in the long term. Mitigation to control potentially undesirable vegetation in the floodplain is explained in Section 2.2.3.3 and would reduce the impact to flooding to a less than significant level.

4. CONSULTATION AND COORDINATION

This chapter reviews agency consultation and coordination that occurred prior to and during preparation of this EA/IS.

4.1 FEDERAL AGENCY INVOLVEMENT

The 2000 Pilot Project is to comply with requirements of the Fish and Wildlife Coordination Act and the Endangered Species Act. Reclamation is continuing close coordination with the Service to meet these requirements. The Service has been involved in the SRRHRP long-term planning effort and in the planning for the 2000 Pilot Project.

For the 1999 pilot project, Reclamation received a letter from the Service that the 1999 project was not likely to adversely affect federal listed species under the Endangered Species Act. Reclamation initiated informal consultation with the Service for the 2000 Pilot Project on April 6, 2000 with a request for assistance in identifying threatened, endangered, proposed, and candidate plant and animal species that may be located in the affected reaches of the San Joaquin River. The Service provided this assistance under informal Section 7 consultation. Based on a review of the Monitoring and Coordination Plan and the EA/IS the Service found that the proposed project is not likely to adversely affect listed species.

Cooperating agency representatives to the SJRHRRP are:

U.S. Fish and Wildlife Service	Bea Olsen, Dale Garrison
U.S. Geological Survey	Mike Scott, Pat Shafroth, Greg Auble

4.2 STATE AGENCY INVOLVEMENT

CEQA requires that the Lead Agency (Friant Water Users Authority) must formally consult with responsible and trustee agencies in determining whether to prepare an EIR. The primary tool for this CEQA coordination is the preparation of the Draft EA/IS for review by these state agencies through its transmittal to the State Clearinghouse. Consultations occurred during the 30-day public review of this EA/IS and include agencies who comment on the EA/IS.

Prior to the formal public review process, the following representatives have participated in the planning for the 2000 Pilot Project:

California State University, Fresno	Roland Brady, John Suen

The following agencies were sent copies of the Administrative Draft EA/IS:

State Lands Commission	Chris Vardas
The Reclamation Board	Peter Rabbon

Comments on the Draft EA/IS were received from:

California Regional Water Quality Control Board, Central Valley Region
Caltrans
Department of Water Resources (2 letters)
State Lands Commission
The Reclamation Board

4.3 LOCAL AGENCY INVOLVEMENT

The following local agencies and their representatives have been involved in the planning for the 2000 Pilot Project:

San Joaquin River Group Authority	Dan Fults
San Joaquin River Exchange Contractors Water Authority	Steve Chedester, Jack Threlkeld

The Lower San Joaquin Levee District (Reggie Hill) was sent a copy of the Administrative Draft EA/IS for review and provided comments.

The following agencies commented on the Draft EA/IS:

Lower San Joaquin Levee District
San Joaquin River Exchange Contractors Water Authority
San Luis and Delta Mendota Water Authority
Westlands Water District

4.4 OTHER ORGANIZATIONS

The following environmental organizations and their representatives who have been involved in planning for the 2000 Pilot Project are:

The Bay Institute	Peter Vorster
Natural Resources Defense Council	Monty Schmitt, Drew Caputo, David Behar
The Nature Conservancy	Mike Roberts

The San Joaquin River Parkway and Conservation Trust, Inc. and the San Joaquin River Flood Control Association provided comments on the Draft EA/IS.

4.5 ENVIRONMENTAL COMMITMENTS

U. S. Bureau of Reclamation and SJRRHRP Partners

Reclamation through the SJRRHRP and numerous interested parties has developed a flow regime for releases of water for the 2000 Pilot Project from Friant Dam. Reclamation is also the lead agency under NEPA for preparation of this EA/IS. Commitments by the SJRRHRP to avoid or to mitigate potentially significant adverse impacts that could result from the proposed action are explained in Section 2.2.3 and are part of the proposed action. Commitments that involve Reclamation and the SJRRHRP are (1) Millerton Reservoir operations limitation during the June-October period and (2) implementation of the Monitoring and Coordination Plan (Appendix A) along with additional monitoring for vegetation that could affect flood flows. Reclamation will operate Millerton Reservoir consistent with the limitations described in Section 2.2.3.1. The SJRRHRP will purchase water for the proposed action consistent with the limitations described in Section 2.2.3.2.

Friant Water Users Authority

The Authority is responsible for amending its land use agreement with the State Lands Commission, and for amending a license and an encroachment permit from the State Reclamation Board.

4.6 DISTRIBUTION LIST

The Draft EA/IS was circulated to agencies and individuals on the 2000 Pilot Project mailing list. The distribution list is provided here and on the following pages.

Assemblyman Dennis Cardoza
State Capitol, Room 4139
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APPENDIX A
MONITORING AND COORDINATION PLAN

APPENDIX B
ALTERNATIVE WATER RELEASES

APPENDIX C
SPECIAL-STATUS SPECIES

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